2-1-2004

Foreign language teachers' use of technology in instruction: An exploratory study

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FOREIGN LANGUAGE TEACHERS' USE OF TECHNOLOGY IN INSTRUCTION: AN EXPLORATORY STUDY

by

Clara G. Hoover

A DISSERTATION

Presented to the Faculty of

The Graduate College at the University of Nebraska at Omaha

In Partial Fulfillment of Requirements

For the Degree of Doctor of Education

Major: Educational Administration

Under the Supervision of Dr. Gary N. Hartzell

Omaha, Nebraska

February, 2004

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Clara G. Hoover, Ed. D.

University of Nebraska, 2004

Advisor: Dr. Gary N. Hartzell

ABSTRACT

During the past two decades, technology availability and use in elementary and secondary education has increased significantly. Billions of dollars are spent each year to equip schools with technology, and administrators are inundated with information advocating the use of technology to enhance learning. Little research is available, however, that adequately describes technology use in high school foreign language courses.

The purpose of this exploratory, qualitative study was to develop an initial understanding of how and why high school foreign language teachers use technology in instruction. Six high school foreign language teachers, each from a different district in a Midwestern state, participated in the study. The data consisted of a Preliminary Information Form, teacher interviews and 40 classroom observations.

This study confirmed that these teachers use technology for some aspects of instruction. They use technology more for resource preparation and classroom management than for teaching. Students participate in technology-integrated activities created by these teachers. Teachers report using technology to motivate students and provide a variety of instructional strategies. The primary reason given for using

technology in foreign language instruction, specifically, is to connect students with current, authentic Internet resources that help develop the students' understanding of the target culture. Students use videotapes, audiocassettes and CDs to listen to native speakers; however, using computer technology to develop communication skills occurs less frequently.

Recommendations for further research include a study based on immersion over a longer period of time in a single teacher's classes, a state-wide survey of technology use in foreign language instruction, a study on the effectiveness of using technology to enhance language acquisition, and, because little research has been conducted at the secondary level, replicating some of the college-level studies reported in the literature. Recommendations for practice are that administrators must understand the unique ways in which technology can contribute to foreign language instruction, develop a vision of what constitutes effective integration of technology, and then base decisions on this vision.

ACKNOWLEDGEMENTS

The completion of this dissertation is another milestone in a life-long learning process. My first foray into the world of educational administration was Gary Hartzell's interpersonal relations course. I took the course simply because I had heard of Gary's interest in school library media programs and wanted to learn more about him and his ideas. Once I took the course, I was hooked. Gary became my advisor when I was admitted to the educational administration program. His friendship, encouragement and advice have been most welcome and invaluable in every step of the dissertation process.

This study builds on the insight gained from UNO faculty and fellow graduate students. This dissertation would not have been possible without the willingness and cooperation of the study's six participants. In addition, I am grateful to my trusted readers, Donna Flood and Peggy Moore.

On a personal note, I thank my parents, Deane and Marion Gunderson, for instilling in me at a very early age the love of reading and the curiosity to learn, and for continuing to be interested in my endeavors. I thank my cheerleaders—my brother and sisters. I thank my husband, Hal Hoover, who has encouraged, supported and collaborated with me throughout my academic pursuits. We brainstormed together. He challenged my thinking. He read and commented on all my writing. When I began this process, I knew Hal's encouragement and support would be unending. He exceeded all expectations. We've enjoyed the process together.

Finally, I thank my librarian friend, Ruth Toor, whose AASL presidency theme has been an ongoing inspiration. "Learning never ends.

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CHAPTER 1

Introduction

- The President of the United States tells radio listeners of the progress made, during his administration, in expanding access to technology in schools across the country (Clinton, 2000).
- A technology impact study reports that, during a three-year period, $14 million was spent on computer-related technology in schools in a central region of New York State. By the end of those three years, the student-to-computer ratio was 7:1 (Technology Impact Study, 1997).
- A suburban school district's flyer encouraging parents to move to the district boasts that computer skills are integrated into all subjects, all classrooms have Internet connections and the student-to-computer ratio is 4:1 (A Great Place to Learn!, 2002). [1]

Statements such as these are made frequently to paint favorable impressions of schools and their use of technology. These statements by themselves, however, do not describe *how* technology is used in schools. Specifically, they do not begin to explain how technology is used in instruction, how students use technology or what is different in a technology-rich classroom. This study focused on the instructional use of technology by selected high school foreign language teachers. Data gathered from interviews and observations led to explanations of *how* and *why* these teachers use technology in instruction.

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[1] Although no date is given, district personnel confirm the document was created and distributed in 2002.

Statement of Purpose

In the last two decades, use of technology in elementary and secondary education has increased significantly. Although teachers began using computers for personal use and to manage instruction in the 1980s, few used them as instructional tools. Today, more teachers use computers as an integral component of instruction. Students, parents and community members expect computers, software and the Internet to be part of each student's learning experience. Lower hardware costs, improved computer capabilities and graphical user interfaces have contributed to both increased availability and more computer use by teachers and students. In addition, the proliferation of Internet resources has made it possible for teachers and students to access current information from anywhere in the world at little or no cost. Use of technology is not limited to information access; technology also assists in analysis, application and evaluation of information, as well as in the way students organize and communicate what they have learned.

Throughout the United States, billions of dollars are spent each year to equip schools with computer hardware, software and network access (Archer, 1998; Cuban, 2001; Glennan & Melmed, 1996; Kleiman, 2000; Trotter, 1997). In 1998, approximately 6 million computers were available in American schools, and nearly 80% of those schools had Internet access (*CEO Forum*, 1999). Significant amounts of money are also spent to ensure teachers know how to use technology and integrate it into instruction and learning. Taxpayers want to be assured this money is well spent. Students, educators and parents need to be assured technology is being used effectively and efficiently in the

classroom and that it helps "prepare students for their lives in the 21st century" (Kleiman, Online).

To date, most national, state and local reports have been based on quantitative data. These reports, in the same fashion as the three statements at the beginning of this chapter, refer to the number of computers in schools (often failing to note that some of these computers are on secretaries' and administrators' desks), the ratio of students per computer, the number of network drops per classroom and the amount of time students use computers (Glennan & Melmed, 1996; Technology Impact Study, 1997). Some studies even attempt to link students' performance to their use of technology (Kulik, 1994; Salpeter, 1998; Wenglinsky, 1998).

In another report, one district administered a technology use survey to administrators and secretaries and a similar survey to technology initiators and secondary department heads but not to other teachers (Scrogan, 1997). The survey of initiators and department heads contained 14 questions asking about the frequency with which teachers in their buildings or departments used applications such as word processing, spreadsheets, databases, e-mail and the Internet. Only one question inquired specifically about the instructional use of technology. It asked respondents to identify how frequently their teachers used technology in the delivery of curriculum.

Three problems exist with many of these reports. First, because widespread use of computer technology in education is a relatively recent phenomenon, few reports reflect what is taking place in classrooms today. Second, some reports on the educational benefits of technology (e.g., the 1999 and 2000 *Research Report*[s] *on the Effectiveness*

of Technology in Schools, published by the Software & Information Industry Association) are written or sponsored by persons or organizations with close ties to computer companies, thus bringing into question these reports' objectivity (Edmonds, 1997). Third and most important, few reports utilize sound research methodology to describe how computers are used in the secondary classroom. Much of the available information is based on self-reports rather than systematic investigations (Cuban, 2001; Schultz, 2002). These self-reports are "prone to inflation and selective memory" (Cuban, p. 120). The question remains: How are high school teachers using computers in instruction? In other words, what are teachers and their students actually doing with technology?

Some researchers have acknowledged that the key factor in technology utilization is to what degree, if any, computers support curriculum and instruction (Hadley & Sheingold, 1993; Hawkins & Collins, 1992). In order for technology to be effective, classrooms must be equipped with computers, and teachers need to integrate them into their teaching. More importantly, teachers must understand how, and believe that, technology can enhance teaching and learning. In her mixed-methods study of characteristics of college faculty who integrate technology into their teaching (76 survey respondents, seven of whom were interviewed), Jacobsen (1998) concluded:

> The mere presence or use of computers in classrooms does not, in itself, change anything. Instead, it is the way that faculty think about teaching and learning, and their beliefs about what teachers and students can do differently with the technology that can fundamentally change education. (p. 4)

Although the literature on educational technology still seldom addresses questions of actual use at the secondary level, during the past 10 years this literature has grown beyond reports that focus on numbers of computers and Internet drops. More and more we read studies about the technology skills required of teachers, how teachers adopt technology as a teaching tool, and the relationship between technology and student achievement (Brickner, 1995; Brown, 1999; Hadley & Sheingold, 1993; Jacobsen, 1998; Kulik, 1994; Wenglinksy, 1998). Professional journals abound with articles describing exciting classroom projects; however, these are generally isolated examples and/or teachers' self-reports. The literature describing what technology-rich secondary classrooms look like and what is different when technology is effectively integrated into instruction and learning is limited. Even though the literature review presented in Chapter 2 cites many sources, only 20 of these could be considered sound research. Most of these studies were conducted at the college level, only three (Bogard, 1998; Keating, 1963; Schultz, 2002) at the high school level.

In summary, the amount and variety of information on the use of technology in education are enormous. School administrators are inundated with articles, presentations and proposals advocating the use of technology to enhance learning. Yet in spite of many pilot studies, attitude surveys and descriptive self-reports, as well as a few studies utilizing sound quantitative or qualitative methodology, more empirical research is needed. Many studies describe how technology is used in college-level foreign language instruction; however, little research provides valid, reliable in-depth analysis of use at the secondary level.

Purpose of Study

What might an administrator see if he or she were to step into a high school foreign language classroom where teachers and their students were using technology? This study attempted to paint a picture of the technology-rich classroom, specifically, the foreign language classroom. The purpose of this study was to understand more fully *how* and *why* high school foreign language teachers use technology in instruction. Exploring how teachers use technology is not simply a matter of stating a teacher uses a specific type of presentation software to display diagrams or students access information using the Internet. This study focused on foreign language teachers' use of technology as an instructional tool, creating an environment in which their students use technology in the learning process.

My interest in this topic developed during the last 15 years from personal experience and continued reading of professional literature on the use of educational technology. To date, much of the research on this topic has been quantitative in nature. In this exploratory study, data were gathered from classroom observations and interviews of six high school foreign language teachers in different high schools in a Midwestern state. These teachers were perceived by their peers as effectively employing technology as an integral part of instruction. The constant comparative method (Glaser & Strauss, 1967; Miles & Huberman, 1994) was used to analyze the data. The emerging patterns formed a basis for understanding how and why high school foreign language teachers use technology in instruction.

Research Questions

Grand tour question. *How* and *why* do high school foreign language teachers use technology in instruction?

Subquestions.

- How do these teachers use technology in instruction?
- Do these teachers' students use technology as part of their learning experiences?
  - If yes, how?
  - If yes, what is the teacher's role when students use technology?
  - If not, why not?
- Why do these teachers use technology?
  - What beliefs do they have about the role of technology in instruction?
  - What factors contribute to or inhibit the teachers' use of technology?
  - What technology background and training do the teachers have?

Definitions

Technology. For the purpose of this study, technology meant any "electronic or digital products or systems" (*American Heritage Dictionary*, 2000) that enable teachers and students to access, integrate, manage and produce information in a wide variety of formats. These technologies include, but are not limited to, computers and computer applications, the Internet, CD-ROM, laser technology, video, telecommunications, networking and other emerging technologies. Distance learning and online learning, per se, were not included in this study. Most likely, the decision to teach via distance and/or

online learning is made by district and/or building administrators rather than by individual teachers. The intent of this study was to examine instruction planned by teachers rather than determined by persons outside the classroom.

Instruction. Instruction was interpreted liberally to mean teaching. This study considered instruction to be anything a teacher does to direct or guide learning in a recognized course of study defined as a high school class.

The focus of this study was on how and why teachers use technology when working with students. Teachers used technology as they presented information and/or demonstrated concepts to students, created environments in which their students used technology in the learning process, made information available online or communicated with students via e-mail. Instruction occurred in the regular classroom and in computer labs to which teachers took their students. In the broadest sense, instruction included activities such as homework and projects students created outside the classroom.

High school. High schools in this study included grades 9 (in one school, 10) through 12. Five were public; one was private. Five were located in suburban areas; one was in a small community not far from a large city.

Foreign language. For the purpose of this study, foreign language referred to the teaching of a second language to students who normally read, write, speak and listen in English. The classes taught by the participants included French, German, Japanese and Spanish. Teachers of English language learners were not considered in this study.

Teachers. Only state-certificated individuals responsible for direct instruction of high school students were studied. This study did not look at computer use by administrative, clerical or support personnel.

Assumptions

This study was based on the assumption that participants were honest and thoughtful. The participants were teachers, recommended by peers and administrators, who were perceived as effectively using technology in instruction. Therefore, this study assumed these recommended teachers were, indeed, using technology in instruction.

Limitations

One limitation of this study was the sampling process. Participants were selected using purposive sampling (Bogdan & Biklen, 1998; Creswell, 1998; Patton, 1990). Specifically, the teachers constituted a homogeneous sample in that each taught foreign language in a high school setting. I contacted administrators and other professionals asking for recommendations of teachers who were perceived to be using technology effectively in instruction. I did not define "effective." I hoped these recommendations would result in a larger pool of teachers from which I could select participants. This did not happen. Only six participants were recommended and agreed to participate.

Another limitation related to the observations. Rather than dropping in unannounced, I scheduled observations for times when teachers had already planned to use technology. I asked that nothing special be planned for my visits. Although I conducted 40 observations over a 2-month period, I did not immerse myself in the classrooms for an extended period of time. I did not see a full range of teaching

activities, nor could I guarantee that my visits did not influence whether or not, or how, the teachers and their students used technology.

Delimitations

This study was delimited to only one academic discipline. Although it would be valuable to study teachers from multiple disciplines, this study was exploratory and focused on foreign language teachers only. The themes that emerged from descriptions of how teachers use technology may or may not be similar to descriptions of how teachers in other disciplines use technology. In addition, the number of participants was small. They were from one Midwestern state. For the most part, they were from suburban, public high schools. The experiences of these teachers may or may not be similar to those of foreign language teachers in other high schools.

Significance of Study

This study contributes to the ever-growing body of literature on the use of educational technology and is valuable to professors and students in teacher education programs. Through this study, current and future educators will better understand how technology integration can enhance instruction and learning.

This study is also useful to administrators and local board of education members in making decisions concerning technology and, ultimately, in developing their vision for how technology can and should be used by teachers and students in their school districts. Although the research on educational technology has grown rapidly, little of it adequately describes how secondary teachers use technology in instruction. This study is significant because it describes what an administrator might observe in a technology-rich, high

school foreign language learning environment and explains why these teachers and their students use technology. The description of this experience may help administrators and other decision makers understand not only the potential for technology in instruction but also the factors essential for realizing this potential. This understanding may assist administrators in making decisions about equipment purchases, technical support and staff development; improving facilities to accommodate technology; and arranging teachers' schedules to facilitate the effective use of instructional technology.

In my own school district, building and district administrators have said this type of study is sorely needed. In fact, when I described my study and told them that, to guarantee credibility, the study would be conducted outside our district, administrators expressed disappointment that the study would not be conducted in our own district. This study may serve as a model for future district studies. It should provide administrators with an understanding of what constitutes effective classroom use of technology. In addition, the emerging themes may form the basis from which to develop a survey administrators could use as a first step in investigating how teachers in their buildings use technology.

This study is also significant on a personal level. One of my responsibilities as a curriculum facilitator is to conduct an evaluation of our district's foreign language program. Part of this evaluation will focus on teachers' use of technology with their classes. Reviewing the literature, conducting this study and analyzing the data have helped me develop a better understanding of this phenomenon.

Chapter 2, a review of the literature, summarizes the history of technology use in foreign language instruction, focuses on reasons given for using technology, and describes how technology is currently used in foreign language instruction. An explanation of the study's methodology follows in Chapter 3. Chapter 4 contains the results of this study and provides the basis from which the conclusions in Chapter 5 are formed.

CHAPTER 2

Literature Review

Introduction

The literature on the use of technology in education has grown at an almost overwhelming pace. A wealth of popular literature advocates the use of specific technologies and describes projects and lesson plans that integrate technology into instruction and learning (Albrecht & Davis, 2000; Reissman & Gil, 2000; Reynolds & Plucker, 1999). Many articles explain how projects are conducted or how to use particular technologies; few describe what an administrator, for instance, might see and hear if he or she observed a technology-rich, high school foreign language classroom.

Because technology integration is a relatively recent phenomenon, this review, for the most part, is limited to literature published during the past 10 years. The ideas presented here are not meant to predict what would be observed in a classroom but to provide a contextual setting for this study.

Many reports describe benefits of using technology in foreign language instruction, students' positive attitudes towards technology and specific applications of technology in foreign language instruction. Many reports are personal accounts, pilot studies or assessments based on surveys and questionnaires. Some studies are qualitative; few utilize quantitative methods. Most studies were conducted at the college level, few at the secondary level. Because many studies are qualitative, often pilot studies, the number of participants in each study is small. Overall, researchers conclude there is no convincing evidence that computers improve students' language skills

(reading, writing, speaking and listening). More research is needed, especially studies based on empirical evidence (Brandl, 2002; Liu, Moore, Graham & Lee, 2002; O'Dowd, 2003; Salaberry, 2001; Schultz, 2002; Stepp-Greany, 2002). Schultz' contention reflects the conclusions of other researchers—that, although many studies describe how technology is used in foreign language instruction, little research provides scientific validity or in-depth analysis. Many sources are cited in this review; however, only a portion of them could be considered sound research.

Two published literature reviews summarized the literature and provided background and bibliographic leads for this literature review. Liu et al. (2002) examined ERIC documents and refereed journals in the fields of technology and foreign language instruction from 1900 to 2000. Twenty-one journals and 246 articles were selected for the review. Salaberry (2001) described the history of the use of technology in foreign language instruction. This retrospective was based on his analysis of articles appearing in *The Modern Language Journal* since its inception in 1916.

The current literature review begins with an historical explanation of the use of technology in foreign language instruction. The discussion then focuses on reasons for using technology. In addition to perceived and reported benefits, technology's role as described in *Standards for Foreign Language Learning in the 21st Century* (1999) and changes in foreign language pedagogy are described. This review concludes with descriptions of how technology is currently used in foreign language instruction.

History of Technology Use in Foreign Language Instruction.

Although technology has been used in foreign language instruction for more than half a century, the types of technology and their roles have changed significantly during this time (Adolph & LeBlanc, 1998; Armstrong & Yetter-Vassot, 1994; Chapelle, 2001; Chism, 2000; Moeller, 1997; Salaberry, 1996, 2001).

Early audio technologies. If we consider technology in the broadest sense, we must acknowledge the role of audio technology in the first part of the 20th century. In the 1910s and 1920s the phonograph was used to teach pronunciation. Students were motivated by the novelty of the phonograph, which educators felt increased interest and stimulated memory (Salaberry, 2001). Radio was used as early as the 1930s to deliver original broadcasts and other types of spoken language from all over the world. Teachers provided assistance and feedback to students via the telephone. With teleprompters (two telephones, loudspeaker, control panel and optional tape recorder) teachers could recreate realistic situations (Salaberry, 2001).

Salaberry's (2001) retrospective also mentioned conventional technology, blackboards and overhead projectors (still in use today) and what he termed unconventional technologies: the audio-active voice reflector, placed over a student's face to reflect his or her voice into an earpiece for the purpose of improving pronunciation, and dormiphonics—lessons played on an automatic record player while a student falls asleep or wakes up. The dormiphonics technique was used in the 1940s but was not successful in helping students acquire language skills.

Language labs. During World War II, the Army Specialized Training Program utilized language labs to teach language to military personnel (Keating, 1963). Through its behaviorist methodology, ample time, small class size and latest technology, the Army method provided a quick, intense learning process for students selected because of their "high I. Q. and a strong motivation for language study" (Keating, p. 5). This "audiolingual method was characterized by highly controlled exercises and patterned drills in order to instill an immediate conditioned response" (Chism, 2000, p. 21). During the 1950s and 1960s, educators installed language labs in high school and college language classrooms. In the 1960s and 1970s students often used centralized language-learning labs to listen to audiotapes of native or near-native speakers. Widespread use of these labs was made possible by legislative support. The labs were largely funded by the 1958 National Defense Education Act (Salaberry, 2001). The potential for the audiolingual method to produce automatic oral responses and provide many authentic resources also contributed to the widespread use of the labs through the 1970s (Salaberry).

Language labs consisted of students sitting in carrels, wearing headsets and being monitored by an instructor or laboratory assistant. Students were expected to listen to words, phrases and sentences and repeat them. Educators felt learning language via this listening and speaking technology would result in better fluency; however, because it was simply a stimulus-response process and not integrated into real life experiences, it did not produce the anticipated results. This ineffectiveness was attributed not only to the fact that language learning was not integrated, but also because the audio equipment had

technical difficulties and tapes were of poor quality. Other disadvantages were that the drills were not meaningful, materials were not appealing to students and teachers were not as involved in the learning process (Salaberry, 2001). The functions of the lab were limited. In addition, changes had occurred in foreign language pedagogy. "Language classes were based on an audio-lingual model that tended to discourage autonomous communication among students" (Armstrong & Yetter-Vassot, 1994, p. 475). Salaberry (1996) attributed the demise of the language-learning lab as related to the shift from behaviorist to constructivist pedagogy. Further, the demise of these language labs occurred as computer-assisted instruction (CAI) emerged with its computer-based teaching. This type of programmed instruction was perceived as being pedagogically effective. It was fast and provided instant feedback (Salaberry, 2001).

Although advantages of the language labs were stressed in the 1960s and 1970s, research on their effectiveness produced mixed results. Raymond Keating (1963) conducted a landmark study on the use of language labs by 5,000 high school French students in 21 school districts in the New York metropolitan area. Prior to Keating's study, most of these districts reported increased motivation, better pronunciation and more rapid learning. After analyzing student scores on three different tests (reading, listening and speaking), however, Keating concluded that students who did not utilize the language labs actually outperformed those students who learned in the labs. Based on his conclusion, Keating further stated the labs were a waste of tax dollars (Salaberry, 2001). This study was so controversial that, in 1964, *The Modern Language Journal* published several articles in an attempt to discredit Keating's research. These articles argued that

Keating did not control variables, used incorrect statistical measures and did not follow proper statistical methodology or utilize proper materials. *The Modern Language Journal* followed with articles suggesting the use of language labs produced a significant difference (improvement) in speaking and listening skills; however, there were no significant differences on written and reading tests (Salaberry).

Visual media. Various forms of visual media have been used in foreign language classes. In the 1950s, television was utilized to deliver pre-recorded lectures. Filmstrips, then film and videotapes exposed students to authentic resources and native speakers, allowing students to hear voices, dialects and registers other than those of the teacher. Sometimes videos were used as advanced organizers (Salaberry, 2001).

By the mid-1980s, language labs were either replaced by or equipped with videotapes, videocassette recorders and television monitors. Culturally authentic videos replaced films, slides and filmstrips (Adolph & LeBlanc, 1998; Armstrong & Yetter-Vassot, 1994). Video gave "students a richer context in which to learn the target language because it provides visual and oral input, i.e., students are exposed to various regional accents and sociocultural norms while viewing authentic scenes from the foreign country" (Armstrong & Yetter-Vassot, p. 476). Watching interactions among native speakers occurred via videos, satellite broadcasts and television performances. Although students could not communicate with these native speakers in person, students were able to observe and listen to real people, not just actors, interacting with families, friends and co-workers in their native language. "Language learning then becomes more than an

endless series of verb conjugations; it is the gateway into the lives of a different group of people" (Armstrong & Yetter-Vassot, p. 477).

Computer technology. In the late 1980s, easy access to microcomputers, instead of reliance on mainframe computers, and improvements in software made it possible for computers to become an integral tool in the repertoire of foreign language instructors (Chapelle, 2001). At first, computers simply replaced paper worksheets and were used for drill and practice. Moore (1999) contended that, at the beginning of the 1990s, most foreign language software was used for vocabulary and grammar drill and practice. Although at first a novel idea, this instructional method did not challenge or motivate students. Exercises were not integrated into authentic situations (Moeller, 1997). Once computers were capable of enabling students to interact with videos and providing access to unlimited sources of information via the Internet, then technology truly became a key component in the constructivist-based foreign language classroom (Adolph & LeBlanc, 1998; Armstrong & Yetter-Vassot, 1994; Moeller, 1997). The international connectivity provided by the Internet makes it an affordable tool for foreign language teachers at all levels and provides universal access to authentic materials and synchronous communications such as chat rooms (Chapelle, 2001). Indeed, the advent of user-friendly, networked computers in the 1990s was a boon to their use by foreign language teachers.

Computer-assisted instruction. The use of computers in foreign language instruction has developed in different forms. In the 1960s and 1970s, computer-assisted instruction (CAI) delivered computer drill programs via central computer systems.

Computer-assisted instruction did not spread as rapidly nor as widely as anticipated because of high implementation and maintenance costs, lack of technical support personnel and good software, and skeptical teachers. Dissatisfaction with computer-assisted instruction grew in the 1970s and 1980s (Salaberry, 2001). In addition, Ford-Guerrera (1997) contended that computer-assisted instruction was limited to what was taught in the classroom. These computer programs were similar to textbook drills.

Computer-assisted language learning. Although computer-assisted language learning (CALL) was first used in the 1950s, it was not documented until the 1960s (Chapelle, 2001) and was more prevalent in the 1970s and 1980s. It went far beyond drill and practice. The computer delivered multimedia lessons, tracked student activities, provided tests and evaluated student speech. The best-known computer-assisted language-learning program was PLATO. The original program compared students' speech with machine speech and provided canned feedback. Another version, Intelligent CALL, incorporated a natural language processor that was unreliable in recognizing verb conjugations. Machine feedback via CALL was not thought to be as effective as human feedback (Salaberry, 2001).

Chun and Brandl (1992) discussed how they used Communicative Gap Exercises (a Macintosh program) to enhance the meaning of CALL. They felt most CALL programs still consisted of drill and practice exercises and that this new software was an improvement because it created "meaningful context for the learner" (p. 263), provided better feedback, simulated situations and had more online help features. CALL was interactive, integrated with curriculum and incorporated visual, audio and graphics. It

went beyond drill and practice by providing guided communication rather that being just grammar based, utilized whole sentences not just single words and set each lesson within a meaningful context.

CALL was first used in higher education. Courseware resided on mainframe computers with students using terminals on and off campus. The best-known CALL study was conducted by Richard Atkinson at Stanford in the 1960s. The Stanford Project utilized computer-assisted instruction in several disciplines, including language learning. Atkinson's research on the acquisition of German vocabulary was based on a test administered to college students one week after CALL instruction. Learning was optimized when students self-selected the sequence of material rather than the items being presented in random order (Atkinson, 1972). Atkinson found that learning could be improved by "having a computer program select items for practice on the basis of learners' past history of performance and item difficulty" (Chapelle, 2001, p. 4).

Computer-mediated communication. Computer-mediated communication (CMC) came into being in the 1990s. CMC provides two-way, synchronous communication via simultaneous videoconferencing (Liu et al., 2002; Salaberry, 2001). *InterChange*, a component of *Daedalus*, is a "synchronous discussion tool that allows users to have real-time written conversations" (Liu et al., p. 253). First developed to teach English to English-speaking students, *InterChange* is now also used for second language instruction. Research on CMC stresses its benefits. CMC promotes student engagement and allows students to have meaningful, authentic conversations. Because the output can be saved

and sorted in many ways, students can monitor and reflect on their own learning (Liu et al.)

CMC paved the way for using the Internet, especially e-mail, as a vehicle for online communication (Salaberry, 2001). The Internet became a popular tool in foreign language instruction in the mid-1990s (Chapelle, 2001). The Internet connects students with authentic, current resources. E-mail, chat rooms, bulletin boards, web sites and digital video are available to students via the Internet. The Internet can be interactive, enabling students to respond by speaking and writing in their target language as well as in English (Liu et al., 2002). In addition, Ford-Guerrera (1997) mentioned communicating with key pals as a specific use of e-mail and discussed MayaQuest, one of many Internet WebQuests students use in foreign language classes.

Word processing, CD-ROMs and speech recognition software. Three other technologies warrant mention. Word processing is the most universally accepted use of computers in education today; however, studies have produced mixed results regarding the impact of word processing on foreign language learning (Liu et al., 2002). Ford-Guerrera (1997) discussed the use of CD-ROMs and how they allow students to interact with material, not just react to it. She said speech recognition software analyzes students' oral proficiency and provides feedback. According to Liu et al., however, this software is unreliable. It seems to work with native speakers but is not reliable with non-native speakers.

Professional organization and publications. Two measures of the lasting impact of technology on foreign language education are the formation of a professional

organization and the publication of journals devoted to the topic. CALICO, the Computer Assisted Language Instruction Consortium, emphasizes modern language teaching and learning via technology. The organization considers itself a leader in computer assisted learning and instruction. It has existed for 14 years, publishes *CALICO Journal* and other publications, and sponsors an annual symposium. The online journal, *Language Learning & Technology*, was first published in 1997. This refereed journal for second and foreign language educators can be accessed at no cost.

In the previous section, we reviewed the history of technology in foreign language instruction. Next, we will explain why technology is used.

Why Technology Is Used in Foreign Language Instruction

Pedagogical changes and new foreign language standards have contributed to technology becoming an integral component of foreign language instruction. During recent decades the underlying foreign language pedagogy has changed. This shift is examined. Technology's role in *Standards for Foreign Language Learning in the 21st Century* (1999) is described. The section concludes by discussing perceived and reported benefits of using technology.

Changes in foreign language pedagogy. Foreign language pedagogy changed during the second half of the 20th century. The emphasis changed from language learning to language acquisition (Krashen, 1982). Additionally, the focus shifted from a behaviorist to a constructivist approach. No longer is the foreign language instructor the authority disseminating knowledge while students are a passive audience. The emphasis today is on communication, learning language in context and learning about culture using

authentic resources (Elkabas, Trott, & Wooldridge, 1999; Moeller, 1997; Moore, 1999; Moore, Morales, & Carel, 1998; Scott, 1998; Walz, 1998).

Learning about culture is an important aspect of learning a second language. In the professional community, educators have debated the role of culture for many years until "culture instruction became a sanctioned component of the curriculum" (Osuna, 2000, p. 325). No longer is culture just a study of the literature and achievements of the target society. Now, foreign language educators interpret culture more broadly and consider it a "composite of human activity" (Osuna, p. 325).

In the past, teachers talked *about* a language but seldom talked *in* that language. The goals of foreign language teachers and students were quite different than today's goals (Moeller, 1997):

> The teacher's goal was to ensure that students learned the vocabulary and grammatical rules of the target language. The goal of learners in such courses was often to pass an examination rather than to use the language for a daily communicative interaction. Language learning was something done unto the learner, rather than something done by the learner. (p. 5)

Foreign language learning now focuses on interaction and language use. The language is seen as a tool to learn content. Moeller (1997) described the constructivist learning environment in foreign language classrooms: "When instructors are an [sic] architects of interaction, students become information gatherers and negotiators as well as builders and co-workers" (p. 7). She continued by explaining how power is transferred to students when they solve problems and are involved in role-playing and simulations.

Scott (1998) and Chism (2000) also referred to the change in learning theory from behaviorist in the 1950s and 1960s when stimulus-response conditioning was the status quo. At that time, foreign language learning was initiated by an external stimulus to which students reacted. Cognitive theory was prevalent in the 1970s and 1980s and stressed the learner should be active in the learning process while the teacher assumed the role of "facilitator or advance organizer" (Scott, p. 4). The evolution in learning theory affected foreign language learning as well. Teachers began "to rethink how to teach grammar, how to balance listening, speaking, reading, and writing, how to teach culture in our multicultural world, and much more" (p. 4).

Moeller (1997) and Moore (1999) discussed the importance of learning language in context, learning about culture and using authentic materials in the process. Authentic materials (e.g., Spanish language newspapers and magazines, French travel and museum guides, German videos and television programs) are usually thought of as those "produced by native speakers for use by other native speakers" and are used to teach "language in context" (Moore, p. 3).

The difference between language learning and language acquisition was clearly explained by Elkabas et al. (1999). Language learning focuses on vocabulary and grammar; whereas, language acquisition, "because it concentrates on meaning, leads the learner to acquire unconsciously the forms of the language" (p. 243). Language learning is a conscious process while language acquisition is an unconscious endeavor (Krashen, 1982).

Foreign language standards. *Standards for Foreign Language Learning: Preparing for the 21st Century*, first published in 1996, was a collaborative effort of the American Council on the Teaching of Foreign Languages, the American Association of Teachers of French, the American Association of Teachers of German and the American Association of Teachers of Spanish and Portuguese. The expanded document was published in 1999 as *Standards for Foreign Language Learning in the 21st Century*, a collaboration of the four original organizations and seven others. This effort was known as the National Standards in Foreign Language Education Project. The document includes language-specific suggestions, explains current foreign language pedagogy and emphasizes the link between language acquisition and culture.

The focus of foreign language learning is reflected in five goal areas (called the Five C's) that form the foundation of *Standards for Foreign Language Learning in the 21st Century*:

Communication: Communicate in languages other than English

Cultures: Gain knowledge and understanding of other cultures

Connections: Connect with other disciplines and acquire information

Comparisons: Develop insight into the nature of language and culture

Communities: Participate in multilingual communities at home and around the world

In addition, seven curricular elements are interwoven through all five goal areas. These elements are not explained in this literature review; however, they need to be identified because technology is one of them. These elements are:

Language system

Cultural knowledge

Communication strategies

Critical thinking skills

Learning strategies

Other subject areas

Technology

An illustration in *Standards for Foreign Language Learning* shows how these five goal areas and seven curricular elements are interwoven. The five goal areas are the warp; the seven curricular elements the weft. Both are essential for creating a fabric. In this case, the fabric is effective language learning.

The link between technology and the standards was explained in detail by several authors (Gonglewski, 1999; Pusack & Otto, 1997; Schultz, 2002; Walz, 1998). They stressed how technology, especially the Internet, not only assists but also is necessary for students to meet the standards. Technology, however, is more than the Internet. Technology includes audiotapes, videotapes, computers and the Internet. Although Gonglewski talked at length about the link between technology and the standards, she admitted, "Research explicitly connecting the Internet with the Standards is surprisingly sparse, and no systematic explication of the ways Internet tools help L2 learners achieve each Standard exists" (p. 348). She stressed that technology has to be carefully planned and integrated into the curriculum. Technology must "support and enhance the learning

experience rather than serve as the driving force" (p. 349). In addition, she warned that technology is not a quick fix.

In his description of how the Internet can be used to help French students meet the standards, Walz (1998) talked about the Internet helping with communicative competence by providing information in a variety of formats and for a variety of purposes to develop content knowledge. He stressed that the Internet is *the* single best source of authentic resources. A wide variety of current resources are available at minimal expense and for different levels of language proficiency. Walz continued by saying the standards formalize goals for students and teachers. These goals include not just knowing a language but being able to use the language, using the language to help learn other disciplines and helping to communicate and share knowledge. The standards emphasize communication rather than grammar. Students should acquire a greater range of skills and develop proficiency in each of the five goal areas.

The alignment of technology with the standards becomes apparent when the attributes of multimedia are examined (Pusack & Otto, 1997). Combining media types maximizes learning by matching activities with students' learning profiles. Students are motivated and more engaged in these learning activities. In addition, authentic resources provide real-world learning experiences. Multimedia provides both teachers and students more control of their learning. Students control sequence, pace, navigation and repetition. Interactivity is another characteristic of multimedia. Students interact with a variety of resources, many of which are linked to each other.

Gonglewski (1999) also discussed how the Internet helps students meet the standards. She said the goals identified in the standards require students "to use the language to engage in independent, skill-building, and task-driven activities" and that Internet resources are "a way to expand the study of foreign language beyond the boundary of the classroom" (p. 349). She later stated the Internet "increases cross-cultural awareness and motivates students to continue their language learning beyond the classroom setting" (p. 360). She continued by saying Internet resources enable all students to communicate with speakers from "across the globe, quickly and without great expense" and that incorporating Internet resources "is not just an intriguing concept—it's a necessity" (p. 360).

In his discussion of the standards and the role of technology, Schultz (2002) noted that technology, especially the Internet and multimedia, is invaluable in helping students achieve those standards dealing with culture. In addition to describing how interwoven technology and the standards are, several sources explained ways in which technology assists students in meeting each standard (Abrams, 2002; Gonglewski, 1999; Walz, 1998).

Communication. Although there is no real substitute for communicating with native speakers than by doing so in their country, technology is a good alternative. It connects learners with other speakers of the language and provides more opportunities to practice the language without leaving the country (Gonglewski, 1999). Technology connects speakers rapidly and inexpensively. Students can express feelings and exchange

opinions via e-mail (with their teachers, other learners and native speakers), listservs (individually or as an entire class), chat rooms and news groups.

Communication is more than speaking and listening (Gonglewski, 1999). It also includes providing and obtaining information. A wealth of Internet genre and styles is available in languages other than English and can be used by learners of all proficiency levels. The information is often interactive and real-time. Because sound (authentic radio broadcasts and song lyrics, for instance) is available via the Internet, students can practice their listening skills (Gonglewski). Walz (1998) mentioned authentic radio and television broadcasts and said students could also utilize museum and university web sites, online newspapers and weather reports.

Cultures. Gaining knowledge and understanding of other cultures is emphasized frequently in articles discussing how technology enhances language learning. The technologies that contribute to learning about culture most effectively are the Internet and multimedia (Abrams, 2002; Schultz, 2002). For example, Internet advertising (French products or American products sold in France) gives a good picture of French culture. In another instance, manufacturers of French automobiles have created great web sites from which students could learn about French culture (Walz, 1998).

Gaining knowledge of other cultures includes learning not only the structure of that language but also its vocabulary and grammar rules. Language is "interaction and discourse in context" (Gonglewski, 1999, p. 355). When students view and listen to authentic multimedia, they hear verbal messages and see nonverbal cues. In addition, Gonglewski's (1999) thesis aligns with Walz' (1998): The Internet provides an

abundance of authentic texts such as online newspapers and magazines as well as chat rooms where students can discuss current events and ask questions related to articles they have read.

Connections. Connecting with other disciplines is the emphasis here. Online journals and other resources in the target language provide information for even lower proficiency students. Statistical information is also available and may need little translation. Print media such as newspapers and magazines often have online counterparts with information frequently released on the Internet before it appears in print. One of Walz' (1998) favorite sites is a French science museum that explains experiments students can perform, lists needed supplies, gives directions and provides biographies of the scientists who developed the theory behind each experiment. Students could present their experiments in English to their science class and in French to their French class. Current and back issues of the magazine *Québec Science* are available online and contain many links to other science sites. In citing the plethora of connections that can be made through these online resources, Walz stressed that the linked nature of the Internet encourages interdisciplinary discovery.

Comparisons. The Internet can help students compare languages and cultures in various ways (Walz, 1998). Using e-mail and chat rooms, students can hypothesize and then compare the target language with their own. Online dictionaries, grammar references on teacher web sites and web journals can assist with this comparison. Web journals can be individual or whole-class endeavors in which students create portfolios about trips abroad or report on virtual trips (Gonglewski, 1999). Journals could be

autobiographical and include visuals such as digital photos. Walz cited the French language web site of the Royal Canadian Mounted Police. Using this site, students can compare and contrast United States, Canadian and French driving regulations. Another site, French Pratique, contains a wealth of information on public life in France—the family, the legal system, employment, education and sports. Again, students can compare and contrast these topics with corresponding topics in the United States.

Communities. Participating in multilingual communities at home and around the world is facilitated by the Internet. Students can participate in listservs or exchange electronic diaries with students in other countries (Gonglewski, 1999). Because authentic resources, including listservs and e-mail, are accessed via the Internet, students can continue to access them to communicate outside class. Students can create and maintain their own web sites in the target language, incorporating information about different communities (Walz, 1998).

While there is much overlap in these goal areas and the ways in which technology can be utilized to help students achieve these standards, the described activities are occurring in schools today. Clearly, the Internet assists language learners in connecting with the target culture, increases cross-cultural awareness and motivates students to continue learning the language (Gonglewski, 1999). The Internet is an "integral part of meeting the Standards for foreign language learning" (Walz, 1998, p. 112).

Explaining why teachers use technology in foreign language instruction consisted of three foci: changes in foreign language pedagogy, the influence of standards and

perceived or reported benefits of using the technologies. Pedagogy and standards have been addressed. We now focus on the benefits.

Benefits of using technology in foreign language instruction. Many reasons are given for using technology in foreign language instruction. Technology facilitates the constructivist learning environment utilizing Vygotsky's (1978) concept of scaffolding as, "the creation of support systems among speakers to facilitate language learning," in which students "build support structures for one another as they exchange ideas, answer each other's questions, and negotiate for meaning in their study of texts" (Beauvois, 1998, p. 109). Vygotsky's term, collective scaffolding, describes students helping each other build on prior knowledge and construct their own meaning (Chism, 2000). Technology allows students to be more in control of their learning, can foster higher-level thinking skills and complement students' learning styles and multiple intelligences (Elkabas et al., 1999).

How, specifically, can technology enhance foreign language instruction? Although *Standards for Foreign Language Learning in the 21st Century* (1999) acknowledges that instruction includes communicating with pen pals and using a variety of print resources, these standards strongly encourage teachers to utilize newer technologies. In fact, in describing how curricular elements are woven together in foreign language learning, the standards list technology as one of the strands:

> Access to a variety of technologies ranging from computer-assisted instruction to interactive video, CD-ROM, the Internet, electronic mail, and the World Wide Web, will help students strengthen linguistic skills,

> establish interactions with peers, and learn about contemporary culture and everyday life in the target country. In addition, students can expand their knowledge of the target culture via edited and unedited programs available on short-wave radio, satellite broadcasts, and cassette or video recordings. (p. 35)

A variety of reasons were given for technology being an effective component of foreign language instruction (Armstrong & Yetter-Vassot, 1994; Butler-Pascoe, 1997; Elkabas et al., 1999; Moeller, 1997; Moore, 1999; Moore et al., 1998; Salaberry, 1996). These reasons include access to authentic resources, helping to develop writing skills and matching the individual students' learning styles and pace.

Access to authentic resources. One of the primary benefits of using technology is that the Internet provides students with easy access to unlimited, current authentic resources (Chun & Plass, 2000; Frommer, 1998; Pusack & Otto, 1997). "Multimedia as a massive storehouse of recorded realia makes a great deal of sense in the classroom setting" (Pusack & Otto, 1997, p. 17). Students are able to access current weather information, travel guides, catalogs from foreign universities and daily newspapers from countries whose language they are learning (Armstrong & Yetter-Vassot, 1994; Moeller, 1997; Moore, 1999; Moore et al., 1998). These resources take advantage of realistic settings and use color and motion. They simulate historical monuments, take students inside museums and classrooms and enable students to virtually walk well-known streets. Not only can technology provide access to authentic resources; it can also introduce them earlier in the student's language learning experience (Davis, 1994).

Authentic resources help students better understand and interpret people who live in the culture students are studying (Lafford & Lafford, 1997). Moore (1999) warned that textbooks and other instructional materials often represent cultural stereotypes, especially of middle-class life, in the target cultures. She questioned whether or not newer technologies would help students "develop broader perspectives about the ever changing, never static nature of culture." She continued by stating, "It is not the use of the authentic materials, per se, that is important but the tasks and activities students perform using authentic texts" (p. 4). She also recommended using the Internet, specifically the World Wide Web, to "immerse students in simulated settings where their emotions can be challenged, where they can question their biases and cultural prejudices, and where they can lose their ethnocentric ways of viewing 'the Other'" (p. 4).

Students can use the Internet to access information about ongoing changes in countries they are studying (Moeller, 1997). Moeller referred to three types of culture: informational (encyclopedias and newspapers), behavioral (editorials and interviews) and achievement (art museums, music clips and literary works).

The Internet presents "opportunities (and challenges) for creating better instructional material to teach language and culture and making more effective use of those materials than was previously possible" (Moore et al., 1998, p. 110). Teachers, however, must learn how to take advantage of these technologies.

Students feel technology gives them more opportunity to use the language (Armstrong & Yetter-Vassot, 1994). They report:

CALL materials have given them additional practice when preparing for written exams;

The interactive nature of computer applications encourages them to explore the material in more depth;

Watching videos has increased their aural comprehension;

Using e-mail gives them additional access to instructors;

Using technology has increased their overall technological literacy.

(p. 479)

Develop writing skills. Armstrong and Yetter-Vassot (1994) also reported on the benefits of using technology to develop writing skills in the target language. Students use computers for pre-writing activities such as formulating ideas and deciding on vocabulary. Technology is also used to record paired conversations and create poetry.

Learning styles and pace. Although discussing the use of technology in the ESL (English as second language) classroom, Butler-Pascoe's (1997) ideas are just as applicable to foreign language instruction. She stressed how computers work with multi-sensory resources and meet the needs of students with different learning styles. She listed several benefits of using technology with second language learners:

Creates independent and collaborative learning environments.

Decreases student anxiety.

Facilitates different stage[s] of language acquisition.

Develops communicative competence.

Facilitates authentic assessment.

Motivates students.

Provides immediate feedback.

Meets needs of different learning styles.

Stimulates critical thinking. (p. 21)

In addition to the benefits of having real-time access to authentic resources in order to better understand the culture, technology enables students to take more control of their own learning (Bush, 1997; Frommer, 1998; Jung, 1994; Moore, 1999; Pusack & Otto, 1997). Technology can be individualized to meet the needs of the language learner. It allows students to vary the time they spend on different tasks. For instance, they can use repeat and replay functions to hear and/or see phrases until they are understood. Students can choose to see printed text as well as listen to spoken text. They can also set their own schedules and pace their learning.

Teachers like using technology because of "the value of authentic video, active student learning, student self-pacing and sequencing, the teacher's ability to deal with various learning styles and modalities, the development of complex skills, [and] the cooperative learning environment" (Bush, 1997, p. 297). Students said they "liked working at their own pace and controlling the instructional process; found the lessons to be interesting; liked hearing native speakers in authentic situations; remarked, often with surprise, that they could actually understand the conversations in the video" (p. 297).

Three studies (Besco, 1998; Chism, 2000; Edmonds, 1997) used qualitative methods to examine the impact of specific technologies on foreign language acquisition. Edmonds described "students' perceptions and interactions as well as administrators' and

instructors' perceptions and expectations of multimedia" (p. 12) and focused on the use of computer-based language learning (CALL) and interactive multimedia (IMM) in the teaching and learning of French at the university level. The perceived benefits come not from the computers themselves but from course design and format. Edmonds warned, "Computers do offer students access to vast amounts of information but without the tools or cognitive abilities to organize and process information, knowledge and understanding will never be achieved" (p. 256).

Besco (1998) explored how students in a college-level French class use the Internet to access authentic resources. Students tend to skim and scan. They seek general meaning rather than details and limit their searching to information that meets their specific needs. Students report that the flexibility, nonlinear links and open-endedness of the Internet make these resources seem more relevant to their lives. They feel "more connected to France than when they worked with other materials" (p. 279). Besco concluded, "If students find that the Web makes the target culture seem more real to them, teachers and program directors should capitalize on this factor, not only in using the Web in foreign language classes but possibly also in basing entire courses around the Web" (p. 279).

In her exploratory study of second-year French students, Chism (2000) attempted to develop an understanding of how electronic bulletin boards can be used in college foreign language classes. Electronic bulletin boards, with their capability for providing synchronous and asynchronous communication, offer many possibilities to foreign language students. Sometimes called chat rooms, electronic bulletin boards contribute to

a constructivist environment in which students communicate directly with each other and with persons outside the school. Communication via electronic bulletin boards is similar to face-to-face conversation and fosters self-regulating skills and the "social context for dialogic thinking" (Chism, p. 183) not always found in a traditional classroom. Thus, computer technology contributes to the Vygotskian concept of a constructivist environment for foreign language students.

In describing a networked, hypermedia learning environment used by college students in a second-year German class, Chun and Plass (2000) mentioned the benefits of using both synchronous (chat rooms and videoconferencing) and asynchronous (threaded discussion groups) communication. Networked, multimedia tools were incorporated into the development of all skills and competencies expected of the students: listening (narration and voice mail messages), speaking (record phone messages), reading (read a variety of texts and access online dictionaries) and writing (write letters and e-mail, participate in discussion groups). In addition, the multimedia environment enabled students to access, create and present information in multiple modes and nonlinear formats.

Other benefits. Student perceptions of language learning in a technological environment have also been reported (Stepp-Greany, 2002). A questionnaire was administered to 449 college students in a first-year Spanish course in which several types of technology had been used. Two-thirds of the respondents said they learned more in this class than they would have learned in a regular class. Two-thirds of the students said their listening and reading skills had

improved because of lab activities. Half the students felt their writing skills improved because of the lab activities; however, the students did not like the writing activities. Two-thirds thought the class was more interesting because technology was used. Finally, fewer than half the students said the lab experience helped them improve their test scores. Stepp-Greany recognized the limitations of her study: Students self-reported. Other factors such as student ability and personality type, technology experience and amount of Spanish background were not taken into account. She concluded by suggesting more empirical studies were needed on the technology-enhanced learning environment.

One study of elementary school foreign language teaching bears mention here. Nutta et al. (2002) utilized quantitative and qualitative methods to compare the results of text-based instruction with computer-enhanced instruction for students in two, after-school Spanish classes. The qualitative data consisted of whole-group observations, videotaped class sessions, interviews with three students from each class (one text-based; the other computer-enhanced) and observations of these six students participating in a think-aloud activity. The data revealed that students in the computer-enhanced class liked the interactivity and immediate feedback provided by computers. Because students enjoyed using computers, they were willing to spend more time perfecting their output. The observations showed students in the computer-enhanced class read with fewer stops and hesitations, had better pronunciation and used larger chunks of language. On the other hand, analysis of the quantitative data (scores on norm-

referenced and criterion-referenced tests) showed no statistically significant difference in outcomes or proficiency and only a small, but statistically significant, difference in achievement. Students in the computer-enhanced class scored slightly better on the tests than did the students in the text-based class.

Two reports discussed the benefits of using electronic communication (Bernardt & Kamil, 1998; Gonglewski, Meloni, & Brant, 2001). The first report described college students' use of electronic discussion groups in a first-year German course (Bernardt & Kamil). Students communicated in English about German culture. Based on their students' writings, the authors felt this method of communication enabled students to reflect about issues, be more engaged, acquire more insight into German culture and ask more questions. Asynchronous communication, rather than synchronous, was effective because students could participate at any time and class time was better spent on other tasks. The use of electronic discussion groups provided flexibility and a more communicative experience for students.

Bernhardt and Kamil (1998) were not clear on how they reached their conclusions that were more affective or attitudinal rather than showing increased learning. These conclusions included that the first-year German class truly became a college-level course, students were treated as adults, four of the 19 students in the program changed their major to German, and five decided to minor in German. This report is an example of much of literature on the utilization of technology in foreign language instruction. Many educators describe their

experiences with technology, but the results are not conclusive, not generalizable and often are not based on any recognized quantitative or qualitative methodology.

Gonglewski et al. (2001) reviewed a variety of articles and reports on the use of e-mail in foreign language learning and concluded that the most important benefit was e-mail's "potential to offer learners opportunities for much more valuable communicative interaction in the target language than was ever possible in the traditional foreign language classroom" (p. 13). Other benefits cited included:

> Extending language learning time and place.
>
> Providing a context for real world communication and authentic interaction.
>
> Extending topics beyond classroom-based ones.
>
> Promoting student-centered language learning.
>
> Encouraging equal opportunity participation.
>
> Connecting speakers quickly and cheaply. (pp. 1-2)

A survey of foreign language and English language learners regarding their attitudes towards Internet-based language learning identified the advantages as being flexibility of time, large quantity and variety of information, fun, reinforcement of learning, privacy, opportunity to repeat exercises and learning culture with authentic resources (Felix, 2002). Disadvantages included the lack of speaking practice, unreliability and slowness of computers, little feedback, no

interaction with peers and being distracted by the amount of information available. The absence of a teacher was perceived as both an advantage and a disadvantage. Felix's report is another example of the literature consisting of self-reports, surveys, pilot studies and descriptions of applications. An abundance of information exists; however, little of it is empirically based (Brandl, 2002; Liu et al., 2002; Salaberry, 2001; Schultz, 2002).

Limitations of technology. For all its benefits, technology also has its limitations. Even though technology is considered an integral component in the foreign language learning process, "technology alone is not what makes a difference in acquiring a foreign language. The use of technology coupled with sound pedagogical principles is necessary. Technology is nothing but a tool in the hands of the teacher and learner" (Moeller, 1997, p. 12). Teachers must "adopt the technologies which will allow us to do those things that we cannot presently do in the foreign language classroom, or which will significantly improve those things that we already do well" (Moore, 1999, p. 481). Moore concluded:

> The use of technology is not about how many bells and whistles we can add to the classroom. It is about empowering the learner. It is about encouraging students to leave behind the notion that learning means rote memorization. It is about exploration and the realization that there are multiple pathways to knowledge. It is about acknowledging that no one route is necessarily the best and that even apparent dead-ends may provide us with valuable information along the way. (p. 483)

Salaberry (2001) expressed concern about the pedagogical effectiveness of new technologies. In questioning whether or not new technologies provide pedagogical benefit, he asked:

> Is increased technological sophistication correlated to increased effectiveness to achieve pedagogical objectives? (i.e., technology-driven vs. principle-oriented pedagogy)
>
> What technical attributes specific to the new technologies can be profitably exploited for pedagogical purposes? (e.g, coding options specific to each medium)
>
> How can new technologies be successfully integrated into the curriculum? (e.g., interaction "with" the computer versus interaction "around" the computer)
>
> Do new technologies provide for an efficient use of human and material resources? (e.g., use of blackboard vs. overhead projector vs. PowerPoint for presentations) (p. 51)

Brandl (2002) warned against jumping on the Internet band wagon too soon and without careful research and planning:

> The Internet is not an ideal way of delivering instruction.
>
> There are too numerous challenges to overcome.
>
> There are still many limitations on interactivity and bandwidth.
>
> The hyper-linked structure and presentation of information on the Internet may easily cause students to get lost.

> We have no control over the quality and accuracy of the contents of the information.
>
> Little theoretical and empirical research actually exists [on how to integrate the Internet and produce outcomes].
>
> Little is known about students' attitudes towards integration [of Internet resources into foreign language learning]. (p. 88)

This section of the literature review focused on the rationale for using technology in foreign language instruction. These reasons included changes in foreign language pedagogy, the role of technology in helping students achieve the goals outlined in *Standards for Foreign Language Learning in the 21st Century* (1999), and the reported or perceived benefits of using technology. The final section of this literature review focuses on how technology is currently used in foreign language instruction.

Current Use of Technology in Foreign Language Instruction

How is technology currently being used in foreign language instruction? Is there any evidence of technology's effectiveness? Many reports describe how foreign language teachers currently utilize technology in instruction. Many reports are personal accounts, pilot studies or assessments based on surveys and questionnaires. Some reports are based on studies utilizing quantitative and/or qualitative methodology.

Much of the literature focuses on student use of the Internet either to access cultural information or to facilitate communication. We will first examine how teachers design Internet-based learning activities. Then we will focus on how students use the Internet to study culture and communicate online. This section on current use of

technology includes a study on the effects of word processing and concludes by discussing three reports on technology-enhanced learning environments in which a variety of technologies are utilized.

Design of Internet-based activities. How teachers design Internet-based learning activities depends on the objectives of the activities, student capabilities, amount of access to technology and the amount of time available. The degree of structure and amount of teacher direction vary (Brandl, 2002; Walz, 1998). Walz described structure in terms of how many web sites are given to students. On one end of the spectrum, students are expected to find all relevant information on one Uniform Resource Locator (URL) provided by the teacher. At the other end of the spectrum, the teacher assigns activities without supplying any URLs, and students use search engines to find information. This type of activity requires students to have higher levels of Internet skills and resourcefulness. A third approach lies in between, with the teacher providing a URL for a complex site (e.g., a WebQuest or the teacher's own web site that contains links to other sites). Students navigate between the main site and the linked sites, utilizing information contained on the linked sites (Walz).

A slightly different and more thorough explanation is provided by Brandl (2002) who described three different approaches to designing foreign language lessons integrating Internet-based reading materials. He labels these approaches as teacher-determined lessons, teacher-facilitated lessons and learner-determined lessons.

In teacher-determined lessons, students use the computer as an online workbook (Brandl, 2002). The teacher selects resources, designs activities and makes activities and

resources available on his or her web site. The teacher tailors content and tasks to students' proficiency levels and guides students through the texts. The benefits of this approach are that reading is silent and individual, and, because students can explore outside of class and on their own time, more class time can be devoted to communicative activities. Concrete visual images are provided for unfamiliar words. Drawbacks for students are that their responses are limited by the capacity of the software and that students are given little opportunity to provide open-ended responses. Drawbacks exist for the teacher, too. This approach is time consuming and cumbersome and requires the teacher to have more technology knowledge and skills.

Teacher-facilitated lessons appear to be the most popular among teachers and students (Brandl, 2002). In this approach, the teacher determines the topic and objectives, prescreens and preselects several URLs for students to use. The teacher designs student tasks, often open-ended but not too broad. In essence, the teacher controls the activity, but the student still has some autonomy. The teacher's role is one of facilitation. Although students follow the teacher's lead, they can still explore. This approach is effective because students are given the opportunity to solve problems. They learn more than when they rely completely on the teacher. Students become better critical readers. Navigating the Internet enhances their reading skills. Teacher preparation time is minimized. The teacher must possess some technical knowledge but can get by with just a few skills. Some attributes perceived as benefits can also be considered drawbacks. The availability of too much information may be overwhelming unless the teacher provides guidance. Some students may find Internet navigation too

difficult and get lost and/or frustrated. To ensure a positive learning experience, the teacher must make sure URLs function properly. Immediately prior to each lesson, the teacher must check all URLs because they can change or disappear. In addition, the teacher must be prepared to provide alternate URLs. Because students will provide a variety of answers to open-ended questions, it is even more important that the teacher establish assessment criteria ahead of time.

As the label implies, learner-determined lessons are entirely learner centered (Brandl, 2002). Learners select their topics, resources and exploration methods. Self-directed, autonomous learners decide on the objectives, resources, process, product and method of assessment. The teacher facilitates when necessary. This approach can be used with both short-term and long-term projects but seems to be more effective with longer-term projects. Brandl explained the benefits of this constructivist approach that leads to authentic integration of skills, processing of information from a variety of sources and simulation of real-life tasks: The work is student-centered and cooperative, not competitive. Although the focus is on content and results in an end product, the process is just as important as the product. This approach involves higher-order thinking skills, teaches the research process, and empowers students. Learner-determined lessons may require students to be more proficient in the target language (if they use web sites written in the target language) and possess more advanced searching skills. The teacher must be very knowledgeable about Internet searching. Determining assessment criteria and creating scoring rubrics are essential to the success of these lessons.

Internet searching and culture. Using the Internet to learn about the target culture seems to be the most common application of technology in foreign language instruction. Four studies described this type of activity (Abrams, 2002; Gardinali, 2002; Osuna, 2000; Osuna & Meskill, 1998).

Osuna and Meskill (1998) conducted a pilot study of 13 college students in a first-year Spanish class that used the Internet to learn about culture. Students were given five activities, each closely aligned with the textbook, that required accessing Internet sites outside the class. Each student responded to a post-activity questionnaire that used a Likert scale to measure perceived learning outcomes, reaction to Internet use and assessment of the tasks. The questionnaire also contained open-ended questions about students' attitudes. Students reported they liked using the Internet and felt their cultural knowledge increased. Osuna and Meskill found that visuals enhanced learning and that students' being allowed to select sites to find relevant information was important. In addition, students were motivated to return to sites after the activities were completed. Osuna and Meskill concluded the Internet provides "current, interesting, varied, and useful information that engages multiple modalities through combined text, sound and visuals" (p. 78).

Osuna (2000) utilized pre- and post-surveys, student journals, observations and interviews in a study of 23 college students in two, advanced Spanish classes. These students chose a culture topic and researched it via the Internet. At the end of 10 weeks, each student submitted a five- to seven-page essay and presented his or her findings to the class using PowerPoint. Osuna grouped his conclusions into three areas: knowledge,

affective and social. Students used their prior knowledge, thought strategically, were engaged and saw the Internet as a permanent link to the target culture and to a variety of knowledge. In the affective domain, the Internet increased motivation and effort. Students took ownership of the tasks, progressed at their own pace and developed more confidence. From a social perspective, students found the Internet to be useful in communicating with native speakers in real contexts and for real purposes. Osuna concluded, "Learning can be assisted by computers when the use of these tools is supported by appropriate theories of learning and careful orchestration of the curriculum" (p. 340).

Sixty-eight students in a second-year German class were studied as they examined stereotypes in both American and German cultures (Abrams, 2002). These students were assigned to four sections of the college class. Two sections were considered the control group and compiled a traditional portfolio. The other sections were the treatment group and completed a non-traditional portfolio. Students in all four sections completed pre- and post-questionnaires about stereotypes and culture and had to share their research with their classmates. Each student in the control group selected a research topic and gathered information via online resources, library materials, the media and interviews. As these students presented, their classmates took notes. Each student was required to submit a one-paragraph reflection on what he or she had learned. Students in the experimental group participated in a Germany-based online chat room discussing stereotypical perceptions Germans held of Americans and American culture. The American students interviewed German speakers in an online forum during class in the computer lab. These

students benefited from hearing first-hand from many more German people than did the students in the control group. Based on the questionnaires, Abrams discovered clear differences between the two groups. Students in the experimental group were "better able to perceive culture from an *emic* perspective than students in the control group." In addition, students who participated in the online discussion "were more sensitive to diversity within German cultures" and became aware that "political boundaries are not adequate for determining cultural memberships" (p. 151).

Another study examined the effectiveness of using the Internet to complement the teaching of culture in a first-year, college Italian course (Gardinali, 2002). The data included the 19 students' homework, their e-mails and bulletin board messages and interviews with eight students. Students accessed authentic cultural materials via the Internet, communicated and shared ideas online and were to turn in eight activities. Nearly two-thirds of the students turned in all eight activities. Another one-fourth turned in six or seven activities. Gardinali's study posed two questions. The first was whether or not the Internet was an effective tool. She concluded that the Internet exposed students to a broader range of authentic resources, students could see how the Italian language was used in real context, and that e-mail and the electronic bulletin board were effective means of providing feedback. The second question asked how students liked network-based teaching. Students liked doing something different than paper-and-pencil projects, contributed to discussion and found e-mail a good way to submit assignments. Shy students were more likely to participate in online communication; whereas, they might not have participated in face-to-face dialog. Gardinali found some improvement in

vocabulary and reading even though students felt the language activities were boring and not useful.

Online communication. Online communication can be accomplished by e-mail, chat rooms and electronic discussion groups. The most frequently mentioned method was e-mail. Two reports described how e-mail is used in foreign language instruction but did not offer any conclusions as to the effectiveness of the method (Gonglewski et al., 2001; O'Dowd, 2003). O'Dowd studied five pairs of college students. Each pair consisted of one British student learning Spanish in England and one Spanish student learning English in Spain. The goal was to develop intercultural understanding and communicative competence. The data included e-mail messages, questionnaires, student interviews, peer group feedback and O'Dowd's journal. Some students' negative attitudes towards the target culture did not change; others' did. The successful exchanges were those in which students had a receptive audience, reflected critically on their own culture and effectively dialoged "with their partners about the home and target cultures." This led to a "growing awareness of differing perspectives on the two cultures' products and practices" (p. 137). These students also understood the rules of the partner's language, analyzed topics, asked questions and expressed personal opinions. They "tried to develop a personal ('friendly') relationship with their partner, as opposed to simply focusing on the task" (p. 137).

Gonglewski et al. (2001) reviewed the literature and described the uses of e-mail in foreign language learning. Group e-mail can be exchanges within one class or between classes in different locations. E-mail is used for pre-class activities to do

preliminary work, prepare for longer assignments and class discussions and to share background knowledge. A teacher can use e-mail after class to send assignments based on student performance, revisit class discussions, clarify options and present new vocabulary. E-mail can also be used for supplemental activities. Interclass (between classes or between institutions) e-mail interaction facilitates collaborative projects focused on reading and writing exchange. Students can use e-mail to participate in groups outside class. One-on-one e-mail between a teacher and student can take the form of informal messages, feedback on assignments and journals. One-on-one e-mail between two students (key pals) is also beneficial in improving communication and understanding culture and communities. Teachers can use the Internet to find key pals, of the same language or different languages, for students. Ideal use would be between a student and a native speaker.

Three studies described the use of chat rooms (synchronous online communication popular with young people) in foreign language classes (Beauvois, 1997, 1998; Lee, 2002). Chat rooms are one form of computer-mediated communication. Beauvois (1998) studied four sections of a second-year, college French course. Two sections, the control group, used *French in Action* videos and workbook and *Le Petit Nicolas* (a collection of light-hearted, educational French short stories). The two other sections were the experimental group and participated in chat rooms using *Daedalus InterChange* software in the computer lab. The teacher asked questions about homework reading of the textbook and *Le Petit Nicolas*. These questions prompted discussion via the chat room. Communication was from student to student and from student to teacher.

All messages were written in French. Based on end-of-semester oral exams, the study found that students in the experimental group had statistically significant, higher scores than did students in the control group. Beauvois attributed the higher scores to the fact that students could work at their own pace, the atmosphere was less stressful, and students' and teacher's continuous reading and writing provided much more experience with the target language.

A previous study (Beauvois, 1997) at another university utilized the same research methodology and instructional methods and resources. Again, students in the experimental group had statistically significant, higher scores on the oral exam than did the students in the control group.

Lee (2002) conducted a pilot study on third-year Spanish students' use of a chat room to improve communication skills. Seventeen students were enrolled in this college course that utilized Blackboard's chat capabilities. Assignments were delivered via Blackboard and included open-ended questions to which students responded. These questions were aligned with assigned readings on everyday Latin American topics such as the environment and men's and women's roles. The teacher posted 12 questions for each of the six topics. Student tasks included writing short essay responses to the open-ended questions and participating in online discussions with classmates. Each student compiled a portfolio containing daily assignments, copies of original and revised online discussions and a final self-evaluation. Students also completed a survey asking about their reactions to using the online activities. Students responded positively about chat rooms saying they contributed to improvement in their Spanish communication skills.

Most students thought the experience improved their language skills, especially grammar. They liked the real-time conversation and found the topics of interest. Another benefit was that both confident and shy students felt comfortable participating. Lee cautioned that because students are used to typing online short cuts in chat rooms, they must be reminded to write completely and correctly. One way of ensuring they do so is to have them "reexamine and revise their exchanges with guided instruction" (Lee, p. 21).

Bernhardt and Kamil (1998) felt electronic discussion groups, because of their asynchronous nature (not writing at the same time), were a better means of communication for students than synchronous chat rooms. College students in a first-year German course communicated with each other via a news group, writing in English about German culture. Being able to write at any time was advantageous, and class time was better spent on other tasks.

Word processing. One quantitative study examined the effects of word processing on foreign language writing (Bogard, 1998). This was one of the few empirical studies conducted in a high school. The data consisted of 336 essays of 91 high school German or Spanish students. The control group wrote using pen and paper, and the experimental group used a word processor. Research did not support the hypothesis that writing would be of higher quality and contain more text when students used a word processor than when they used pen and paper.

Technology-enhanced learning environment. Three reports described a variety of technology activities used to facilitate foreign language learning (Bradley & Lomicka, 2000; Schultz, 2002; Stepp-Greany, 2002). In reporting on student perceptions of

language learning in a technological environment, Stepp-Greany identified several technologies 449 college students used in a first-year Spanish course: interactive CD-ROM; Internet activities; Internet resources such as vocabulary lists, dictionaries and grammar explanations; threaded discussions; e-mail pen pals; and optional drill and tutorial programs. Students responded favorably, saying they enjoyed the technology, felt class was more interesting and that they learned more than they would have in a regular class. The actual impact of technology on learning was not reported in the study.

Schultz (2002) used a questionnaire, observations and teacher interviews to study two German teachers in one high school. The foreign language department had two computers labs with a total of 50 networked computers. Students and teachers had e-mail accounts. Teaching and learning utilized grammar-review software, word processing, multimedia, the Internet, a language lab with audiocassettes, video camera and a television production lab. Schultz concluded that both German teachers used technology in their classes each day and that they used a variety of technologies. The teachers helped and taught each other how to use technology. Technology was used mostly for teaching about culture.

Schultz' (2002) observations confirmed the teachers' self-reports that they did, indeed, use technology. The goals for using technology were to enable students to communicate in multiple modes and to understand German culture. Teachers perceived the benefits to be that technology provided access to authentic language, established a context for learning and fostered an interest in the subject matter. Schultz summarized the implications of teaching in a technology-rich learning environment: Teachers need

technology training. They need time to develop skills and teaching materials, as well as access to technology and technology support staff. Administrative support is needed. Pioneering colleagues are helpful. And, finally, the curriculum must include technology.

In their case study of a technology-enhanced, university language-learning environment, Bradley and Lomicka (2000) described the activities in which students were engaged. Each third-semester language class spent at least one of its weekly sessions in one of three computer language labs. These labs were equipped with *Writing Assistant* (a software program), e-mail and listservs, the Internet, video, audiotapes and multimedia. Students explored cultural material on the Internet, read online French documents, used *Writing Assistant* to improve their compositions, watched video clips and sometimes shared information. The study was conducted via whole-class observations, class documents and interviews of five principal participants. Bradley and Lomicka were not impressed with what they observed. Students were exposed to authentic cultural information via the Internet, but little collaboration or communication among the students regarding this information was seen. Even the collaborative writing listed in the syllabus did not live up to its potential because students were not collaborating. Attempts to promote the use of e-mail and other out-of-class interaction failed, largely because of lack of purpose. Bradley and Lomicka concluded, "We must not forget the importance of actually doing something with that information" (p. 362). Getting the information is not the goal; communicating and doing something with the information is the goal. Although this study was far from impressive in itself, its admonition must be a guiding force in the design of technology-integrated curriculum, instruction and learning.

Summary

This literature review began with an historical explanation of the use of technology in foreign language instruction. Next, the rationale for using technology considered changes in foreign language pedagogy, technology's role in *Standards for Foreign Language Learning in the 21st Century* (1999) and reported and perceived benefits of using technology. This review concluded by describing how technology is currently used in foreign language instruction.

In spite of many pilot studies, attitude surveys and descriptive self-reports, as well as a few studies utilizing sound quantitative or qualitative methodology, more research is needed. Although many studies describe how technology is used in college-level foreign language instruction, little research provides valid, reliable in-depth analysis at the secondary level.

Of all the sources cited in this literature review, only 20 could be considered empirical research (see Table 1). And of those 20, only three (Bogard, 1998; Keating, 1963; Schultz, 2002) were conducted in high school environments. Schultz used qualitative methods to describe how technology was used by two high school German teachers in one school. Bogard and Keating both used quantitative methods to study the effects of technology, and both reached conclusions that might surprise educators. Bogard's research failed to conclude that writing was better and more prolific when German and Spanish students used a word processor than when they wrote with paper and pencil. In his early, landmark study, Keating concluded that French students who did

Table 1

Studies Cited

Author and Date	*Level*	*Nature of Study*
Abrams, 2002	College	Via surveys, studied second-year German student use of an online forum to dispel stereotypes
Atkinson, 1972	College	Quantitative study, found that learning German vocabulary could be improved by computer assisted language learning
Beauvois, 1997	College	Described use of chat rooms in second-year French course. Scores on end-of-year exams were higher for students who had used chat rooms.
Beauvois, 1998	College	Described use of chat rooms in second-year French course. Scores on end-of-year exams were higher for students who had used chat rooms.
Bernhardt & Kamil, 1998	College	Described use of electronic discussion groups in first-year German course
Besco, 1998	College	Dissertation explored how French students use the Internet to access authentic resources
Bogard, 1998	High School	Empirical dissertation on effects of word processing on writing in German and Spanish. Failed to conclude that using word processor improved writing.
Bradley & Lomicka, 2000	College	Described technology-enhanced, language learning environment (French)
Chism, 2000	College	Explored how second-year French students use electronic bulletin boards

(table continues)

Table 1 *(continued)*

Studies Cited

Author and Date	*Level*	*Nature of Study*
Edmonds, 1997	College	Qualitative dissertation on using multimedia and computer based language learning to teach and learn French
Felix, 2002	Multi-Level	Surveyed students (half of them ESL) about their attitudes and experiences using the Internet for language learning
Gardinali, 2002	College	Qualitative dissertation of first-year Italian students using the Internet to access authentic resources
Keating, 1963	High School	Large, multi-district study. Failed to find that students who learned in language lab scored higher on French language exams than students who learned without the lab.
Lee, 2002	College	Pilot study, found that using chat rooms via Blackboard improved communication skills of third-year Spanish students.
Nutta et al., 2002	Elementary	Mixed-methods study comparing results of text-based instruction with computer-enhanced instruction in after-school Spanish classes
O'Dowd, 2003	College	Described how e-mail is used in a Spanish class
Osuna, 2000	College	Used surveys, journals, observations and interviews of 23 Spanish students to learn how they used the Internet for a culture topic
Osuna & Meskill, 1998	College	Pilot study of 13 students using the Internet to learn about Spanish culture

(table continues)

Table 1 *(continued)*

Studies Cited

Author and Date	*Level*	*Nature of Study*
Schultz, 2002	High School	Qualitative study of two German teachers. Confirmed the teachers used technology.
Stepp-Greany, 2002	College	Survey on student perceptions of Spanish language learning in a technological environment

not use language labs performed better on reading, listening and speaking tests than did those students who learned in labs.

The literature focused on why technology is important, how it has been used during the last half-century and how it is currently being used in foreign language instruction. Much of the literature reported on technology integration in post-secondary settings. Little was found, however, that described what one would see and hear if he or she were to observe a high school foreign language classroom in which technology was effectively integrated into the learning process. The sparseness of this type of description is the impetus for this study and leads to the question, "*How* and *why* do high school foreign language teachers use technology in instruction?"

CHAPTER 3

Methodology

Research Design

The purpose of this exploratory study was to develop an initial understanding of how high school foreign language teachers use technology as an instructional tool, why they use it and the role they assign it in the larger context of their overall instructional plan. The design was qualitative, involving content analysis and interpretation of natural data comprised of interview transcripts and observation field notes.

Researcher's Role

Researcher's experience. Merriam (1998) contends a person conducting phenomenological research must have an intuitive grasp of the phenomenon. This is true in my case. My interest in the use of educational technology has developed during the past 15 years from personal experience and continued reading of professional literature. Most of my professional career has been spent as a library media specialist, helping students access and use information and partnering with teachers to plan and implement instruction. Recently, in my work as a curriculum facilitator, I have begun to more fully understand the underlying principles of why technology can be an effective component of instruction and learning.

Researcher bias. I believe technology has great potential to enhance learning; however, it is just one of many educational tools and, if used ineffectively, will not improve learning. The literature on the potential of technology is increasing significantly, but very little adequately describes what a technology-rich, high school

foreign language learning environment is actually like. As I work with foreign language teachers, I have learned about the importance of language acquisition and its relationship to learning about the target culture. I understand how technology can link learners to authentic resources to better understand that culture and, thus, acquire language in the context of its culture.

As an educator working with students and teachers for more than 30 years, I have first-hand experience in using technology to enhance teaching and learning. My recent reading has helped me better understand the role technology can play in instruction and learning. I am biased in that I believe technology has the potential to be an effective learning tool; however, I would be the first to acknowledge technology sometimes causes more problems than it solves, is not a panacea, and some teachers simply use it as a presentation tool that does not change instruction or improve learning.

As a library media specialist I collaborated with foreign language teachers, and now in my role as a curriculum facilitator I work even more closely with them. I have never been a foreign language teacher.

I made every attempt to exclude my personal opinion from the data and to remember that my "primary goal is to add to knowledge, not to pass judgment on a setting" (Bogdan & Biklen, p. 34). In each of my observation notes I included a section of my own reflections, trying to separate those reflections from what I actually saw and heard.

Gaining entry to the setting. The six participants in this study were high school foreign language teachers recommended by library media specialists, technology

specialists, department heads, administrators, other foreign language teachers and acquaintances who perceived these teachers as effectively using technology in instruction. I utilized e-mail to introduce myself and describe my study to the recommended teachers as well as to people who might be able to recommend other teachers. Once I made the initial contact, I followed up with a phone call explaining more about my study, answering questions and trying to ascertain whether or not the teacher might be interested in participating. I explained my study would be based on interviews and observations. I stressed that I wanted to observe classes as normal as possible and that nothing special should be planned for my visit; however, I did request my visits be scheduled at times when the teacher planned to use technology. Maintaining anonymity was imperative not only in the written dissertation but also by not identifying or discussing specific teachers with colleagues. In addition, once each teacher agreed to participate, I wrote to her principal explaining my study and asking for permission to conduct the study in that school.

The initial interviews were scheduled at the teachers' convenience. Two initial interviews were conducted in the teachers' homes; three were held in their classrooms and one in the school's library media center.

Securing permission for the study. Permission to conduct this study was granted by the Institutional Review Board, participants, building principals and school district officials. Prior to presenting the proposal for this study, I participated in the Institutional Review Board's core training modules and completed the quiz for each module. I

submitted an Institutional Review Board application for exempt research. The Institutional Review Board approved my research (see Appendix A).

Before completing the Institutional Review Board application, I spoke with an Institutional Review Board official who explained I needed to submit participant and school permission documents with my application. Each participant signed a Participant Release Agreement (see Appendix B). Each building principal wrote a letter granting permission to conduct the study at his or her school. Each of the six school districts also granted permission. In three districts, this permission was granted only after I had completed a formal application process and submitted an application form with the required documents, including the Institutional Review Board application, my Interview Protocol and Participant Release Agreement. These three districts requested that, at the end of my study, I send them copies of the results. Two districts simply granted permission via e-mail, and one in a letter without my having to follow any specific application process or agreeing to send them my results.

Ethical issues. Ethical considerations for the protection of the participants in this study were ensured by informing them of the nature and processes of the study and by guaranteeing them anonymity. In addition, as researcher, I realized my role was "to gather data, not change people" (Patton, 1990, p. 354).

Each participant and I signed a Participant Release Agreement prior to that participant's initial interview and observation. Each participant retained a copy of her signed agreement. No names, positions, school names or other identifying information

were used in any written or oral summary or report. Pseudonyms were used for each participant.

Data Collection Procedures

Participants. Six foreign language teachers, each from a different school district in a Midwestern state, participated in this study. Each teacher was interviewed twice and observed several times during the 2-month data-gathering period. (Table 2 lists the number of observations for each participant.) Three teachers were observed eight times; one was observed nine times. One teacher was observed four times because she felt the nature of her students' activities did not warrant further observations. The sixth teacher was observed only three times; however, each of her observations lasted approximately 90 minutes. All other observations were concluded in 45-50 minutes. Prior to the initial interview, each teacher was asked to complete and return a Preliminary Information Form (see Appendix C).

Most of the participants were female; therefore, to help ensure anonymity, all participants are referred to as female throughout this study. A pseudonym is used for each teacher. Teachers and their buildings are not portrayed individually, nor are the teachers matched with their schools. To do either would reduce the potential for maintaining anonymity.

The teachers ranged in age from mid-20s to early-50s. (See Table 2 for participant information.) They had 2 to 23 years teaching experience. Five had spent most or all of their teaching careers in their current buildings. One teacher had taught in several schools but had been in her current building only 2 years.

Table 2

Participant Information

Characteristic	*Range/Language Observations*	*Number of teachers*
Age of participant	25 – 34	2
	35 – 44	2
	45 +	2
Years in building	< 5	3
	5 – 10	2
	11 – 19	0
	20 +	1
Years teaching language	< 5	2
	5 – 10	1
	11 – 19	1
	20 +	2
Languages taught	French	2
	German	2
	Japanese	1
	Spanish	2
Number of observations	3	1
	4	1
	8	3
	9	1

The six high schools represented in this study were all located in the same Midwestern state but in different school districts. (School information is provided in Table 3.) Five high schools were in suburban areas; the sixth was in a smaller community. Five high schools were public; the sixth a private school. The six high schools used a variety of scheduling patterns. All five public schools utilized Internet filtering software; however, no filters had been installed in the private school.

Foreign language teachers. Limiting the study to high school foreign language teachers was based on five factors:

- Focusing on a single discipline minimized the potential intervention of variables that might result from inherent differences among subject areas.
- The exclusion of elementary and middle school teachers eliminated the potential intervention of contextual variables such as the organizational and operational differences between school levels and the differences in teaching students of varying developmental levels.
- The national *Standards for Foreign Language Learning in the 21st Century* (1999) identifies technology as one of the key components in foreign language acquisition. Technology enables students to learn languages in the context of the culture they are studying by connecting the students to authentic resources.
- In my own district, I work closely with foreign language teachers. The connections I have made in this work helped me select the sample for this study.

Table 3

School Information

Characteristic	*Category/Range Language*	*Number of schools*
Public or private school	Public	5
	Private	1
School enrollment	< 500	0
	500 – 999	2
	1,000 – 1,499	0
	1,500 – 1,999	2
	2,000 +	2
Number of foreign language teachers	< 5	2
	5 – 10	1
	11 +	3
Languages offered	French	6
	German	6
	Japanese	2
	Latin	2
	Spanish	6

- In addition, this study helped me gain more insight into foreign language teaching, one of the curricular areas for which I am responsible.

Participant selection. A purposeful sampling technique (Bogdan & Biklen, 1998; Creswell, 1998; Maxwell, 1996; Maykut & Morehouse, 1994; Merriam, 1998; Patton, 1990) was used to create a pool of participants who were perceived by their peers and/or administrators as effectively using technology in instruction. Specifically, intensity sampling was used to provide "information-rich cases that manifest the phenomenon intensely, but not extremely" (Patton, p. 182). The criterion for selecting participants was simply that they be foreign language teachers who use technology in instruction.

Selecting teachers from multiple sites allowed me to observe and interview teachers in differing environments. In addition, readers of the resulting narrative would be less likely to identify specific teachers and schools if participants from multiple schools were studied.

In order to decrease the potential for gathering tainted or suspect data, I did not base this study on teachers from my own district. Because of my position, in-district participants might have difficulty being totally honest with me. They may not have wished to risk their comments being shared with administrators or other teachers. In addition, I would not have been able to guarantee them anonymity.

Selecting participants was a challenge. In designing the study, I had hoped my contacts would recommend enough teachers so I would have a larger pool (perhaps 8 to 12 teachers) from which I could select participants. I had planned that, once teachers

were recommended, I would contact them and ask them to complete the Preliminary Information Form. I could then select the final participants based on information they provided in this form as well as what they told me in initial telephone conversations.

During my initial thinking about this study and prior to presenting the study proposal I began to ask colleagues about potential participants. I asked not for the purpose of identifying or contacting participants at that time but for my colleagues to start thinking about who potential participants might be. Initially, I asked foreign language teachers in my own district to recommend teachers in other districts. I also contacted library media specialists, technology specialists, district and building foreign language department heads, and administrators from other districts. I talked with fellow doctoral candidates. In addition, I contacted foreign language consultants from state agencies and institutions. They were unable to recommend teachers other than those who had already been recommended by previous contacts.

The result of all this communication was that only six teachers agreed to participate. Some of my contacts, even in larger districts, could not identify foreign language teachers who use technology in instruction. One participant was recommended by several contacts. Some recommended teachers declined. Some said they were too busy to participate in the study or that they really did not use technology very much. One contact said one teacher who might have been recommended had moved and another was on maternity leave. Another contact asked if I planned to pay participants. (I did not pay them.) One district administrator said very few high school teachers in his district use technology; therefore, he could not recommend anyone. One contact in a large high

school well-known for its integration of technology said he could not recommend anyone because foreign language teachers in his building seldom use technology. In other instances, library media specialists were unable to identify potential participants.

The selection process itself was discouraging. The pool of potential participants was not large enough to enable me to select only those participants who seemed best suited for the study. I became aware that district and/or building administrators and the teachers themselves often held different perceptions of the teachers' use of technology. Perhaps the biggest disappointment was that so few teachers in the largest school districts were recommended and subsequently agreed to participant.

Types of data. Two forms of natural data were collected from each participant throughout the study: interview transcripts and classroom observation field notes. I interviewed teachers, not students. I observed teachers and students working together but did not interact with students. The teacher interviews took place without students present.

In addition to natural data, I asked each participant to complete a Preliminary Information Form requesting demographic and contact information as well as class schedules to help me arrange observations. This form asked teachers to list the types of technology they use in instruction and describe some technology-integrated activities they conduct in their classes. These responses served as springboards for discussion during interviews. The responses were verified by activities observed or information provided in the interviews. Occasionally, I had questions about things I had or had not observed in the classroom. The teachers responded promptly via e-mail to these

questions. Overall, e-mail was a most helpful tool for this study. E-mail helped identify and secure participants, facilitated scheduling of interviews and observations and enabled teachers to respond to my follow-up questions.

Although I used a uniform interview protocol (see below) for the initial interview, data were ultimately collected using a semi-structured interview format that allows "the interviewer considerable latitude to pursue a range of topics and offers the subject a chance to shape the content of the interview" (Bogdan & Bicklen, 1998, p. 94). These questions were open-ended, allowing each interviewee to reveal her understanding and opinion of the topic.

One 60- to 90-minute initial interview was conducted with each participant at the beginning of the 2-month investigation period. As interviews progressed and observations were conducted with all participants, I knew I would benefit from conducting a second 15- to 30-minute wrap-up interview with each participant following her last observation. The wrap-up interview questions asked teachers to clarify and reflect on what I had seen. All interviews were tape recorded and later transcribed and coded.

Following the initial interview, each teacher was observed several times during the 2-month investigation. I had hoped to observe each teacher eight times and schedule the observations in back-to-back class periods (45-50 minutes each) of two different levels of a language; however, the observations did not always occur that way. I was satisfied in observing one teacher's students just four times, always in the computer lab. Because another teacher's classes were 90 minutes in length, I observed her only three

times. I had planned to observe another teacher's classes eight times; however, because I wanted to see her students' presentations that had been partially created during an earlier observation, I ended up observing her classes nine times. I observed the other three teachers' classes eight times. All observations were made in person except one when the school had a last-minute schedule change and my commitments prevented me from observing students presenting projects I had watched them research. For that one time only, the teacher loaned me a videotape of the student presentations and e-mailed me copies of the PowerPoint presentations.

In total, I observed 40 classes, each for the entire duration of the class period. I observed 15 French, 5 German, 3 Japanese and 17 Spanish classes. Of these observations, 11 were of first-year classes, 10 of second-year, 15 of third-year and 4 of fourth-year.

In designing this study, I had initially wondered just how valuable these observations would be and intended to schedule very few. I am very glad I increased the number of observations from the single observation originally planned for each teacher. Understanding how teachers use technology without these multiple observations would have been difficult. The purpose of these observations, which was carefully explained to each teacher, was not to evaluate teachers but, instead, to learn how teachers use technology in instruction and how these teachers work with their students in technology-integrated instructional activities. Although the very presence of an observer in the natural setting may affect an observed activity—an effect known as the Heisenberg Uncertainty Principle (Merriam, 1998; Patton, 1990)—I was more concerned that by not

observing, I would miss something participants had not thought to tell me. Observation gives the researcher an opportunity to see and hear, first-hand, things that may or may not be mentioned in the interview. Field notes of these observations included documentation of teacher and student activities, conversations and behaviors in the classroom. These field notes were both descriptive and reflective in nature and included both memos and field journal entries (Bogdan & Biklen, 1998).

Brief pre- and post-observation conversations were conducted to prepare me for each observation and clarify any questions resulting from the observation. Notes were made from these short conversations, but they were not tape-recorded.

Having three sources of information—interviews, observations and Preliminary Information Forms—helped me develop a "fuller understanding of the phenomenon" under study (Bogdan & Biklen, 1998, p. 104).

Data Recording Procedures

Initial interviews. A few well-chosen questions guided the semi-structured, initial interviews and encouraged each participant to explain her understanding and opinion of a topic. The initial interview questions as listed on the Initial Interview Protocol (see Appendix D) were:

1. **Tell me about your experience as a teacher.**

   (Years of service, types of positions)

   This question helped me become acquainted with the participant. It provided more information than would a simple demographic checklist. The responses also corroborated and expanded on the

information each teacher had provided in the Preliminary Information Form.

2. **Describe your experience using technology in instruction.**

   This request was meant to be the first probe into answering the grand tour question—*how* and *why* do foreign language teachers use technology in instruction?

3. **What types of technology do you use in instruction?**

   (How frequently?)

   This question served as a comfortable starting point for discussion. My experience has been that when teachers are asked how they use technology, they often respond by stating what type of hardware and software they use. Using the Internet to learn about the target culture seems to be the most common application of technology in foreign language instruction (Abrams, 2002; Gardinali, 2002; Osuna, 2000; Osuna & Meskill, 1998). The interviews and observations conducted in this study also revealed frequent use of the Internet to learn about the target culture.

4. **What instructional methods do you use with technology?**

   Although teachers might not have used the words "constructivist" (Brooks & Brooks, 1999; Jonassen, Peck, & Wilson, 1999; Sandholtz, Ringstaff, & Dwyer, 1997) or "traditional perspective," this question was expected to reveal the teacher's philosophy about teaching.

Participants might also have referred to collaboration (Jonassen et al., 1999; Means & Olson, 1994, 1995) or even problem-based learning (Petraglia, 1998; Sage, 2000). The teachers did not refer to these concepts. Instead, the main responses seemed to be motivation, teacher convenience and providing a variety of instructional strategies.

5. **Why do you use these technologies and instructional methods?** Finding out why was as important to me as finding out how teachers use technology. Teachers might not use the word "constructivism" (Brooks & Brooks, 1999; Jonassen et al., 1999; Sandholtz et al., 1997) even if that were their perspective; however, I anticipated they would mention collaboration (Jonassen et al., 1999; Means & Olson, 1994, 1995), how students learn (Dede, 1989; Hancock, 1995; Morgan, 1996), thinking skills (Jonassen, Carr, & Yueh, 1998; Kizlik, 1996; Morgan, 1996), multiple intelligences (McLellan, 1994; Mellon, 1999; Nelson, 1998), learning styles (Ayersman, 1993; Cohen, 1997, 2001; Dunn & Dunn, 1978) or changes in foreign language pedagogy (Chapelle, 2001; Krashen, 1982; Moeller, 1997) as reasons they use technology. The teachers did not refer to constructivism, collaboration or pedagogy; however, they felt technology increases motivation and helps provide a variety of instructional strategies that engage students by taking into account their learning styles, readiness and interests.

6. **Specifically, how does technology affect foreign language acquisition?**

   The literature stresses that technology improves foreign language acquisition by providing students with easy access to unlimited, current resources (Armstrong & Yetter-Vassot, Chun & Plass, 2000; Frommer, 1998; Moeller, 1997; Moore, 1999; Pusack & Otto, 1997), helping students understand the target culture (Lafford & Lafford, 1997; Moeller, 1997; Moore et al., 1998) and making the target culture seem more real. Ewing and Pearce (2001) suggest that technology provides students with authentic pronunciation, motivates them by giving immediate feedback and allows for self-paced learning. The teachers stressed that technology provides access to current, authentic resources that help students understand the target culture. The teachers also said technology provides more opportunities for students to communicate with native speakers and writers; however, the teachers could not say that technology improved reading, writing, listening and speaking in the target language.

7. **Has technology changed your teaching? If so, describe how it has changed your teaching.** (Teaching philosophy, style, attitudes, planning, classroom management)

   I anticipated the answer to this question to be closely related to the teachers' beliefs about teaching and about the role of technology in

teaching. That technology had changed their teaching was not evident from the teachers' comments or observations.

8. **Has technology affected student thinking, learning and/or achievement? If so, how?**

   Some studies on the general use of technology (Kulik, 1994; Salpeter, 1998; Seguin, 1995) link technology with student learning and achievement. Research on the impact of technology on foreign language acquisition produced mixed results. Gardinali (2002) found some improvement in vocabulary and reading. In both of her studies, Beauvois (1997, 1998) found that students who utilized computer-mediated communication scored higher on their oral exams. Another study on the effects of word processing on foreign language writing did not support the hypothesis that utilizing a word processor would produce better quality writing (Bogard, 1998).

   Even if teachers did not have evidence that technology affected learning, they may have had instinctive feelings, even if only anecdotal, about the effects of technology on thinking, learning and achievement. Some teachers in this study felt the use of technology improved their students' writing; however, the teachers had mixed opinions about whether or not technology affected language learning.

9. **Do your students use technology as part of their learning experiences?**

If yes, how? If no, can you assess why not?

I was interested not only in how teachers use technology but, more importantly, in how their students use technology.

If yes, what types of thinking and skills are involved when your students use technology?

I thought I might see different levels of Bloom's (1956) taxonomy exhibited by students when they use technology. The literature suggests a strong connection between technology and thinking skills (Braun, 1997; Kizlik, 1996; Morgan, 1996). This connection was not mentioned in the interviews.

10. **What factors contribute to, or inhibit, your use of technology in instruction?**

The literature suggests two types of barriers to change—first-order (extrinsic) and second-order (intrinsic). In the case of technology use, first order barriers include limited access to hardware and software, limited time to learn and little technical support. Second-order barriers are based on one's beliefs about teaching and technology (Brickner, 1995; Jacobsen, 1998; Seguin, 1995). As first-order barriers are removed, second-order barriers are revealed. In other words, openness to change (using technology) depends mostly on teachers' beliefs about teaching and technology. The teachers mentioned several first-order barriers but seldom acknowledged second-order barriers.

11. **How did you get started using technology?**

    Jacobsen (1998) suggests that those teachers who were early adopters are more likely to have first used computers when they were themselves high school or college students and that they also are more likely to integrate technology into their teaching than those teachers who adopted it later in the diffusion curve. Most of the teachers in this study had used technology in high school and/or college.

12. **Have you been trained in the use of instructional technology?**

    If yes, what kind of, and how much, training?

    I thought the types and amount of training teachers had had might have made a difference in how these teachers use technology. The answers to these questions may have implications for both pre-service training and staff development (Brown, 1999). Most of the teachers referred to staff development and other types of technology training.

13. **Is there something else you would like to tell teachers or administrators about the use of technology in foreign language instruction?**

    This open-ended question allowed teachers to elaborate on anything they had previously mentioned or bring up topics about which I had not asked.

These interview questions were based on the literature on technology and learning, constructivism and foreign language instruction. They represent six types of

questions: experience/behavior, opinion/values, feeling, knowledge, sensory and demographic. Any of the questions could have been asked regarding the past, present or future (Patton, 1990).

Wrap-up interviews. As interviews progressed and observations were conducted, a wrap-up interview with each participant seemed warranted. It, too, was semi-structured and included six generic questions, listed in the Wrap-Up Interview Protocol (see Appendix E), as well as specific questions for each participant. These individualized questions asked participants to elaborate on something mentioned in the initial interview but not observed, for example, confirming the use or non-use of Internet filters or asking for clarification of something unique to that teacher or school. The generic questions, as well as the unique questions, arose from the teacher's initial interview or her observations, or were prompted by something mentioned by other teachers or seen in other classes. The generic questions in the Wrap-Up Interview Protocol were:

1. **Briefly describe what I saw in observations.**

   I summarized what I saw in each observation as a way to refresh both my memory and the teacher's memory. This was also a good way to begin the wrap-up interview. Once the teachers confirmed what I described was accurate, I could continue with the other questions.

2. **Was this typical of other times when you've used technology?**

   I wanted to get a sense of whether or not what I saw was typical of other times when the teacher used technology.

3. **How frequently do you use technology in instruction?**

   (For each of the types of technology I saw used?)

   Again, I wanted to understand how frequently teachers used the technology I observed being used.

4. **How did you feel about what I observed?**

   This question was extremely important. It caused teachers to reflect on what I had observed. I struggled not to be judgmental about what I observed. Not developing opinions about the effectiveness of what I saw was impossible. In asking teachers to reflect on their teaching, I exerted every effort to mask my own feelings and encourage each participant to evaluate what occurred and talk about how effective or ineffective she perceived her teaching with technology to be.

5. **Is there anything you would do differently?**

   This question piggy-backed on the previous question and was designed to get teachers to reflect on what I had observed and how they might modify their use of technology in the future.

6. **How did you accomplish these instructional outcomes or objectives (what I observed) before you integrated technology into the process?**

   The purpose of the question was as stated. I wanted to understand how teachers taught these same outcomes or objectives before they integrated technology. I thought the question might shed some light on what teachers had told me or what I observed.

Following these generic questions and the questions specifically designed for each teacher, I asked if there were anything else the teacher would like to say.

Classroom observations. When observing classes, I wrote on a yellow, lined note pad. I wrote descriptive notes about what I saw and heard. The notes often included explanatory comments from teachers when they responded to my e-mail questions asking for clarification of activities I had observed or statements I had heard. I added my own reflective notes, what I thought and felt about the observations, and even ideas that occurred to me (Creswell, 1994). These field notes were typed, coded and analyzed.

Preliminary Information Forms. Photocopies of each Preliminary Information Form were coded and analyzed.

Data Management

Each initial and wrap-up interview was tape-recorded and later transcribed. During the interview I took brief notes. The interview transcripts and observation field-notes were coded and analyzed along with the responses provided on the Preliminary Information Forms.

LeCompte (2000) stresses the importance "tidying up" (p. 148). This step includes making copies of all data, organizing the data, reviewing research questions to note omissions and even going back to participants to collect more data if necessary. To facilitate identifying the sources later on, I used three different fonts to type the initial interviews, wrap-up interviews and observation notes. Each participant's documents were copied on a different color of paper. Therefore, for example, when I looked at data in Arial font on green paper, I knew it was Linda's wrap-up interview.

Protecting the confidentiality of each participant was of utmost importance. When I first contacted potential participants, I said I would not use their names or other identifying information. This practice was also stated in the Participant Release Agreement. To protect participants' identities, the written narrative uses a pseudonym for each.

Member Checks

Member checks (Guba, 1991; Maxwell, 1996; Maykut & Morehouse, 1994) were used to provide feedback about the interview transcripts. Each participant read and commented on her interview transcripts. This request was made for two purposes. First, it allowed participants to judge the accuracy of what they reported. Second, they could confirm I had accurately captured the essence of the phenomenon. The amount of feedback varied among participants. For the most part, they made very few corrections and comments.

Data Analysis Procedures

The constant comparative method (Bogdan & Bicklen, 1998; Creswell, 1998; Glaser & Strauss, 1967) was used to analyze data gathered in the interviews, observations and Preliminary Information Forms.

Moustakas (1990) stresses the iterative nature of data analysis and the importance of the researcher's immersion in the data until some type of understanding evolves. Moustakas' method of analysis includes organizing and synthesizing data, immersion, taking a rest from the data, going back to the data and repeating this process for all data. At times, I became so immersed in the data I doubted whether I would be able to make

any sense of it. I was too close to the data; I needed to escape. I set the study aside and enjoyed the holidays. My daily walks often provided the fertile setting for thinking about the data and realizing I was prepared to proceed with the next step. Finally, I became eager to start writing. Approximately 9 months after the last interview, I began reporting the data. Writing was a slow process; however, it was made easier because I worked from a good outline created from the data. As I typed, I sometimes realized I needed to rearrange parts of the outline. Organizing and analyzing the data were perhaps the most challenging aspects of the entire study.

For each participant I compiled a notebook containing all of her original documents. In addition to the Preliminary Information Form, initial interview transcript, original handwritten notes, typed observation notes and wrap-up interview transcript, each participant's notebook contained e-mails she sent me and handouts she gave her students. These notebooks were stacked near my desk, and I referred to them frequently throughout the analysis and writing phases of this study. In addition, I created a master notebook containing colored copies of all completed Preliminary Information Forms and transcripts of both interviews for each participant. A second notebook contained colored copies of all typed observation notes. I made two sets of these notebooks—one master copy and one working copy.

Initial coding. To begin the coding process, I slowly read through the working copy of each notebook. I first read the interview transcripts and observation notes without highlighting, just to get a sense of what these documents contained. Then I read them again, liberally highlighting passages and attaching Post-It notes on which I had

written potential codes. This initial coding process took a long time; however, I did not know how I was going to organize these codes. After much mental rehashing of ideas, I decided to take advantage of the technology with which I am most comfortable—the outline feature of Microsoft Word. I created a master outline, starting with the grand tour question and subquestions, and then positioned the interview questions within this outline. I started by reading the Preliminary Information Forms, then the interview transcripts and finally the observation notes—one page at a time—reconsidering all highlighted passages and my notes. I began typing passages—paraphrasing, using key words and often typing entire quotes—into the outline. My intent with this outline was to develop initial categories through open coding.

This tedious process took nearly 3 months and resulted in a 216-page outline I called "initial categories." I began this initial coding by placing words and phrases under the interview questions. That the information could not be categorized by just these questions soon became obvious. I added categories and subcategories. Sometimes I placed information under more than one header. The resulting outline was too large for me to develop an overview of the information. I made a second version of this outline by stripping all quotes, key words and paraphrases, resulting in an outline of just categories and subcategories. Here I could see how the information began to fall under the research questions and interview questions.

At this point, the information had been sorted into the 14 broad categories that appear in Table 4. These categories did not seem to be equal in weight; some seemed to be subsets of other categories. I read through the complete outline making notes about

Table 4

Categories That Emerged from Initial Coding

Main Category
Participants
Why teachers use technology
How teachers use technology themselves
How students use technology
Change in teaching
What teacher would like to do in future
How teacher accomplished objectives before using technology
What teachers do when they can't use technology
Have to be prepared
Teacher's role
Students using technology
Technical
Products
Accountability
Impact on curriculum

combining information, moving it to another place in the outline, the need to use information in more than one place, asking questions and noting which participants had responded or were observed under each category or subcategory. I frequently reread passages in the original documents to gain a better contextual understanding of the data. Based on my notes, I also reviewed the stripped outline, noting which subcategories might be combined and even some that might be eliminated. For example, if a subcategory included only a single comment from just one participant, it may have been removed because I felt it was not a theme. In another instance, for example, I thought some subcategories might be grouped under differentiated instruction; however, as I began to explore what differentiated instruction truly meant, I could see the information did not fit the definition.

Second pass. I read through the huge and stripped-down outlines, both with my notes, and began what I called my second-pass outline. Throughout this process, I frequently went back to the original documents and reread passages to better understand the data within their contexts. This second outline, including quotes, key words and paraphrases, was somewhat larger than the initial outline. I also created a stripped-down version with just the categories and subcategories shown in Table 5. Again, I reread both the full and stripped-down outlines, considering categories and subcategories, writing notes on the pages of both outlines and, for each category, noting those participants to which the data could be attributed. In some instances, when a subcategory could be attributed to just one participant and did not seem similar to information in another subcategory, the information was deleted because it no longer could be considered a

Table 5

Categories and Subcategories That Emerged from Second Coding

Main Category	*Subcategory (if more than just data)*
Participants	Teacher profiles School profiles
Why teachers use technology	Beliefs Teachers' background and training Factors affecting use of technology in instruction
How teachers use technology themselves	Technology available in classroom Use for management Use for instruction
How students use technology	Location Types of technology Activities Purpose for doing specific project
Change in teaching	
Observed activities typical or not typical	
Frequency of technology activities	
How teacher felt about activities	
What teacher would change	
What teacher would like to do in future	
How teacher accomplished objectives before using technology	

(table continues)

Table 5 *(continued)*

Categories and Subcategories That Emerged from Second Coding

Main Category	*Subcategory (if more than just data)*
Teacher's role	Internet—amount of teacher direction With online class Instructional methods Teacher planning Teacher flexibility and/or adaptability Monitoring students using technology
How students used their time	
Students' familiarity with technology	
How students felt about their projects and/or work	
Interaction between teacher and students	
Organization of class	
Arrangement of room	
How students presented to class	
Student behavior	
Student collaboration	
Technical processes	
Information and features on PowerPoints	
Quality of student work	

(table continues)

Table 5 *(continued)*

Categories and Subcategories That Emerged from Second Coding

Main Category	*Subcategory (if more than just data)*
Technical problems	
Requirements of student work	
Time inside/outside of class	
Accountability	
Students don't take responsibility for their own learning	
Impact on curriculum	

theme. I wrote many notes about clustering and/or moving subcategories. Occasionally I removed phrases from the outline noting I had already included that information or that it seemed irrelevant.

Third and final outlines. I now had a huge, third outline. Because the stripped-down version was still too similar to the second outline, I created an even more condensed version that contained the main categories and subcategories for writing the narrative in Chapter 4 (see Table 6). As I typed, I continued to check original documents, write notes to myself about the importance of something I had seen, whether to move a piece of data to another section or perhaps deciding something should not be included. Once I had written Chapter 4 based on this outline, I realized the information about participants belonged in Chapter 3 rather than Chapter 4. Therefore, I moved participant information to Chapter 3. As is often the case in qualitative research, I modified the outline as I wrote. The process of writing, in itself, shed new light on the data. Writing, reading, revising and finding new meaning is a never-ending, iterative process.

Verification Steps

Rigor and trustworthiness were ensured in this study by utilizing three forms of data: interview transcripts, observation field notes and Preliminary Information Forms; requesting member checks in which each participant reviewed her interview transcripts; and peer debriefing. I asked a trusted foreign language teacher to read Chapter 5 to see if the evolving themes and conclusions made sense and to pose questions I still might need

Table 6

Chapter 4 Categories and Subcategories

Main Category	*Subcategory*
Participants	The teachers The schools
How teachers use technology	How teachers use technology themselves How their students use technology The teacher's role What teachers said about students using technology
Why teachers use technology	Beliefs Background and training Contributing factors Inhibiting factors
What teachers would say to administrators	

to answer. During the peer debriefing, I was careful to maintain the participant anonymity.

Generalizability

The processes listed above address the issue of internal validity. In qualitative inquiry, external validity refers to "the extent to which the findings of one study can be applied to other situations" (Merriam, 1998, p. 207). Generalizability is not necessarily perceived by the researcher but is more likely to be inferred by the reader.

The purpose of this study is to describe a phenomenon rather than to suggest the phenomenon is similar to that experienced by other foreign language teachers. This study examined teachers in different high schools. Therefore, it employed to a limited extent a multi-site design. To some degree, studying teachers in different schools maximized "diversity in the phenomenon of interest; this will allow the results to be applied by readers to a greater range of other situations" (Merriam, 1998, p. 212).

That the meanings unearthed by this study can be generalized at all is made possible by rich, thick narrative description (Geertz, 1973). Generalizability can occur by "providing enough description so that readers will be able to determine how closely their situations match the research situation, and hence, whether findings can be transferred" (Merriam, 1998, p. 211).

CHAPTER 4

Results

Introduction

The preceding chapters explained the significance of this study, examined relevant literature and described the methodology used. This chapter presents the study's results. Data collected from interviews and observations are organized into themes that surfaced as interview transcripts and observation notes were analyzed.

The study's grand tour question, "*How* and *why* do high school foreign language teachers use technology in instruction?" consists of two parts: *how* and *why*. Looking at the data in light of each question seems only natural. Descriptions of how participants and their students use technology appear first. The chapter continues by explaining why these teachers use technology: their beliefs about technology's role in instruction in general and, more specifically, in foreign language instruction; factors that contribute to or inhibit the teachers' use of technology; and the teachers' backgrounds and training. This chapter concludes by summarizing suggestions these teachers had for administrators regarding technology.

How Teachers Use Technology

This section describes how teachers used technology themselves and, more importantly, focuses on how their students used technology. The role of the teacher will be examined as well as the teachers' reflections on the students' experiences.

How teachers use technology themselves. Before discussing how teachers used technology themselves, we will describe the technologies available in their classrooms as well as what access the teachers had to computer labs in their buildings.

Technology available in classrooms. In three schools, the participant teacher had one computer in her classroom. Linda's desk was just inside her classroom door. Adjacent to the desk was a side extension holding a computer connected to the building's network. Although Linda sometimes worked at this desk that was, in effect, in the back of the room, she taught and her students presented in the front of the room. Linda also had a cart-mounted television monitor/VCR and a tape cassette/CD player in the front of the room. Linda's department had purchased 10 wireless computers that had been placed on carts and could be moved to each foreign language classroom. During some of her observations, Linda had three of these computers in her room. In addition, Linda's classes used computers in the library media center's computer lab.

Ellen's networked computer was also on her desk in a back corner of her classroom. The door was in the back left and the computer in the back right. Ellen's computer was connected to two television monitors on carts in the front corners of the room. Ellen had access not only to a foreign language/English computer lab located between those two offices but also took her students to a computer lab in the library media center as well as to a cluster of computers in the middle of the library media center.

Mary's computer was on a small desk in a back corner of her classroom, kitty-corner from her main desk and teaching area. A wall-mounted television monitor was to

the side of the main desk. Just inside the door was a tape cassette/CD player. Mary's class used the computer lab in the library media center.

Three teachers had no computers in their rooms. A computer presentation station (computer in a cabinet with a monitor on top) mysteriously appeared in Rachel's classroom just prior to this study; however, the station was removed after a few weeks because it belonged to another department. Other than this brief time period, Rachel had no computer in her room. She had had to choose between having a computer in her classroom or on her desk in a next door office. She chose to locate the computer in her office. Rachel had a wall-mounted television monitor and also a tape cassette/CD player in her room. She could take her classes to one of the computer labs in the school's computer center.

Teachers in Nancy's school utilized a wireless network. Each teacher had a wireless laptop computer; however, Nancy had not yet used her computer in her classroom. She could have used her computer in her classroom and projected on a television monitor but had not yet done so. She used her computer in her office. She was fortunate, however, in that her school had designated one computer lab as a foreign language computer lab. This lab was very close to Nancy's office.

Donna had no computer in her classroom, nor did she have an office. In spite of not having a computer at school, she was the one participant who seemed the most enthusiastic about having her students use technology. She frequently took her students to one of the computer labs just down the hall from her classroom.

Now that the technology available to teachers in their classrooms, offices and schools has been described, we will explain how these teachers used technology themselves—first for management and then as an instructional tool.

Use for management tasks. Four teachers explained how they use their computers for what might be called management tasks. Linda and Mary reported using their computers for word processing, spreadsheets, grade book calculations, Internet searches, e-mail and other tasks. They both mentioned using their computers to create tests and quizzes. In addition, Linda had taken a class to learn how to access the district's student information system and had utilized a calendar web site, which could be accessed by students and parents, for posting important dates and assignments. She also used Inspiration and developed PowerPoint presentations. In referring to using a computer grade book, Linda said, "It's very difficult to be a teacher now and not use a computer. Students are accustomed to receiving print-outs pretty frequently and parents want to know, right now, what is the grade." During one observation, Linda consulted the class roster on her computer to determine the order in which students would present. She also used her computer to create seating charts.

Using PowerPoint slides, Rachel presented her daily announcements and lesson plan to her students at the beginning of each period. She said, "I do all my lesson plans on the Internet." The school has a template teachers can use to create lesson plans. Students and parents can access the web site to see announcements and assignment reminders.

Although she did not use her computer in her classroom, one of the ways in which Nancy used her office computer was to monitor e-mail her students exchanged with their German pen pals.

Use for instruction. As far as instruction is concerned, two teachers mentioned using PowerPoint presentations, instead of a chalkboard or overheads, to introduce vocabulary and grammar. Both Ellen and Rachel seemed especially fond of PowerPoint. Ellen had even used a microphone to record her own voice with matching pictures and words on slides. She said:

> If I'm introducing vocabulary in all five of my classes, I don't go home not being able to talk. That way my students can listen to my pre-recorded voice. I record it one time and they listen to it all day.

For some of her classes, Ellen posted these PowerPoint vocabulary introductions on her web site. Nancy had not yet used PowerPoint with a class but was looking forward to taking a PowerPoint class to learn how to create presentations for her classes. While Ellen and Rachel said they had presented examples and notes via PowerPoint, Linda specifically said she had not done this. Mary mentioned using her computer for PowerPoint presentations, for instance, to introduce an Internet project.

Four teachers mentioned using technology to introduce culture to their students. Donna had created PowerPoint presentations on Impressionist art and French provinces. Linda incorporated video clips of Mexican singers into her unit on Latin American art and music. Ellen showed video episodes (textbook ancillaries) of teen life in Mexico. As

part of a unit on Japanese hobbies, Mary included a short video on *Kendama*, a game played with a ball and a small pointed, wooden stick.

Although only three teachers mentioned using some type of technology to listen to native speakers, most likely all foreign language teachers do this. Rachel said she showed videotaped interviews of Francophone students to her classes. She had also shown videotaped French commercials so that students could see cultural differences. Ellen's students watched videos of Mexican teen life. Mary's students listened to tape cassettes of native speakers pronouncing vocabulary words and singing.

Mary would have liked to use software with which she could have drawn Japanese *hiragana* (phonetic) characters. Instead, she drew the *hiragana* on overhead transparencies. She felt limited by not being able to use this type of software but hoped to have it the next school year.

Three teachers mentioned ways in which they provided online information and lessons to their students. Rachel said that she could create a document in Word, save it as an HTML document and post it on the school's web site. That way, students could access it regardless of the software they might have at home. Nancy was working with a German teacher in another building to develop a district-wide German I site containing mostly enrichment resources. At the time of this study, Nancy and her colleague had developed resources for two textbook chapters. All first year foreign language students in Nancy's district were required to spend one period a week in the foreign language computer lab working on that week's lesson.

Ellen used her web site (part of the school's web site) quite a bit to deliver assignments students completed online. Once her assignments, quizzes and other course documents were posted, Ellen left them online for the remainder of the semester.

We have seen how teachers used computers themselves either for management or instruction. Now we turn our attention to the more revealing part of this study. How did these teachers' students use technology?

How Students Use Technology

More important, perhaps, than how the teachers used technology for management and instruction, is how their students used technology in their learning experiences. Students participated in a variety of activities utilizing different types of technology. Before considering common and/or different elements in these activities, let us observe selected activities for each teacher. These scenarios reveal the variety in the activities and approaches the teachers used.

Rachel's French I class. Rachel met her French I students in one of three computer labs in the school's computer center. Rachel explained the project as she handed each student printed instructions for creating a six-page virtual travel brochure (PowerPoint presentation) on a Parisian monument. The instructions provided links to four web sites, listed information students needed to find and gave requirements for the slides. This activity was a continuation of a previous activity in which students had created short PowerPoint presentations introducing Parisian monuments. Not only were the new slides to contain historical information about the monument (who built it, when and why) but also information (address, telephone number, hours open, admission fee

and web site address) that would attract visitors and help them plan their visits. Each student's brochure was to consist of six slides—a title slide, four informational slides, and the last containing a reference list of all sites used.

Rachel told her students they would spend four days in the computer lab. If they completed their PowerPoint slides in fewer than four days, they would present their slides using the large monitor in the computer lab. Rachel reminded her students to save their work to their own folders on the school's network.

Students could begin their searches by looking at the web sites Rachel had provided; however, students were not limited to these sites. Many students copied and pasted information from the Parisian monument (Eiffel Tower, the Louvre, Hotel des Invalides, Notre Dame, Sacré Coeur, for example) slides they had previously created. Although most students worked independently and quietly, some talked while they worked. One girl used a highlighter to check items on the instruction sheet, marking those tasks she had completed. The teacher walked around to all students answering questions, some about the monuments and some about technical issues. Several students spent a lot of time working on backgrounds and special effects before they began inserting text and images. Just before the end of the period Rachel reminded students about saving their work to their personal folders on the school's server. Throughout the class period, one of the school's technology support persons was sitting at a desk repairing equipment. This person did not interact with Rachel or her students.

In her wrap-up interview, Rachel said her students used PowerPoint once every three or four weeks. When asked how her students learned about the monuments before

she incorporated technology, Rachel said her students used slides and brochures she had collected when she traveled to Paris. More recently students had to create posters or some other type of visual to accompany their descriptions of the monuments.

Nancy's German III class. Nancy's students were the only ones observed exchanging e-mails with pen pals in another country. Nancy met her German III students, the lab supervisor and one of the building's technology support persons in the foreign language computer lab. The goal of the day was for each student to write an e-mail message to send to a student in a school in Germany. As students arrived, the technology support person used a digital camera to take a picture of each student while Nancy took roll and collected assignments. Students had to write their names on a numbered list to ensure each photo was correctly identified. The instructions for the day's work were written on the board in the front of the lab. After making a few announcements, Nancy distributed the instructions each student would follow to write an e-mail message to a pen pal during class.

Throughout the year students exchanged e-mails using the school's e-mail system; however, they did not have individual e-mail accounts. All messages used the name "German 3" as the sender. This made it possible for Nancy to monitor both the messages students sent as well as those they received. All pen pals were students of a teacher from Germany whom Nancy had met several years ago. Foreign language teachers who would like their students to have e-mail pen pals often have difficulty in locating pen pals. Nancy was fortunate to have a German colleague with whom she could make these arrangements. Even if one of Nancy's students did not have a specific pen pal, he or she

could just write "*ein Schuler in* [the town]" on the subject line of the e-mail message and it would reach a student in that teacher's class.

Nancy instructed her students to first check their mailboxes to see if they had received e-mail messages. "If you remember who your pen pal is, or if you have an old e-mail, just reply to that person." Students were to write messages in German about spring vacation, what they were doing during the nice weather, what they did for Easter or Passover, or their summer plans. Nancy told them to write as much as possible in German, but if they got stuck, they could write in English because the German students could read English. While Nancy talked with her students, mostly in English, sometimes in German, the technology support person downloaded the digital photos from the camera into a share folder on a computer and then helped students retrieve their digital photos and attach them to their e-mail messages. Students frequently asked Nancy how to say something in German. She reminded them about appropriate use of capital letters.

After class Nancy said her students write to their pen pals approximately once every three weeks. Sometimes when the students in Germany don't understand something in their textbooks (generally a stereotype or comment on the United States), they write to Nancy's students asking for clarification. The same thing happens when Nancy's students have questions about Germany. Students in both countries exchange questions and answers with each other.

Linda's Spanish III class. Linda was, perhaps, the most technologically savvy of the six participants. Her Spanish III students used Inspiration software to organize information for their oral presentations on legends. Prior to the students' arrival in the

library media center computer lab, the media/technology person had loaded Inspiration on the lab's 29 computers. This person and Linda discussed the process they would use and what students would do on the computers. As students arrived, Linda talked with them in Spanish and explained instructions for the project. Each student was given a handout, written in Spanish, explaining the activity that enhanced the legends discussion in the textbook. Each student was to read three legends from Internet sites listed on the handout or from library books on a cart brought into the lab, use Inspiration to organize ideas for the presentation, create some type of visual aid comparing and contrasting himself or herself with a character from a legend, and present the report orally to the class. The presentation, which was to include the visual aid, would be considered as an oral exam incorporating vocabulary (legend, moral, agreement, hopes) from the current chapter in the textbook as well as different verb tenses students had learned and used throughout the school year.

In addition to giving specific instructions, the handout contained an Inspiration diagram for the legend *Los Novios* that the students had already read. Linda referred to this diagram as she modeled how to use the Inspiration software. She worked on a computer that projected onto a screen in the front of the lab, showing how to change labels, move ideas, organize information and save the document. Linda also told her students about things they would need to know and said they should use their textbooks. She asked the class to define "legend" and said, "The most important thing is not to find spiffy things. The most important is to read the three legends."

Students looked at books on the cart and searched the web sites Linda had provided. Near the end of the period, Linda reminded her students to read their legends that night and that they would work in the lab the next day. They would spend two days in the computer lab and could also work in the lab during their free periods.

Later Linda said she preferred to teach her students about Inspiration herself. "When I know a program I prefer to teach it myself. It's the perfectionistic side of me that prefers to do it my way. I know Inspiration, so I taught it myself." She said a few of her students had used Inspiration in another class. In response to a question about the legends, Linda said students could select a variety of legends or folktales. Students were not limited to selecting a Spanish legend. "The important factor is that they process the stories and discuss them in the target language."

A week later students gave their presentations in the classroom. Prior to the presentations, Linda gave each student a paper containing four small evaluation forms. Each form was numbered indicating which other four students each student would evaluate. Linda had assigned each student a number indicating the order in which they would present. Each presentation was to be evaluated on content, grammar, comprehension and pronunciation, vocabulary, attractiveness and usefulness of the visual aid, overall flow, preparedness and use of visual aid. Each student spoke in Spanish as he or she presented in the front of the room. Each had a poster and could refer to notes written on one small note card. Most students at least glanced at their note cards. They were to use vocabulary from the textbook's legends chapter. They were also to use a variety of verb tenses they had learned during the year. Two days prior to their

presentations, students were to have given Linda the Inspiration print-outs they had created to organize their information.

When asked how students did a similar legends activity prior to using Inspiration, Linda said students had created a diagram or used a paper graphic organizer with a triangle or Venn diagram to compare the legends.

Donna's French III class. Although Donna had no computer at school, she seemed to be the participant who was the most excited about using technology. In her interviews she described a variety of ways she had integrated technology into her teaching. Helping students understand the difference between *passé composé* and *imparfait* (two types of past tense verbs) was accomplished in several ways. Donna began the class period by telling, excitedly and with gestures, a short story in French. As she talked, students were to snap their fingers or tap the table depending if the verb was *passé composé* or *imparfait*. Then students watched a short "mime a crime" video created by a group of students during a previous class period. Students laughed as they watched and answered questions the teacher had asked on a sheet of paper. Donna asked questions in French. The purpose of the mime a crime was not to create a polished video but to focus on appropriate verb tense.

As the first group prepared to tape its mime a crime, another group of students began to read the story *Cinderella* in French. As they read, students were to indicate which verbs were *passé composé* and which were *imparfait*. The students preparing for the video selected simple props and costumes from a large plastic tub. Then three students acted out their mime while a fourth student narrated in French into the

camcorder. Donna aimed the camcorder. (It was her personal camcorder.) A second group selected their costumes and props and taped their video. Then the entire class watched both videos and answered questions Donna had written. Students had to indicate when *passé composé* and *imparfait* were used. Then Donna read the French version of *Cinderella* out loud while students marked the *passé composé* and *imparfait* verbs on their papers.

Two weeks later Donna's students continued to practice *passé composé* and *imparfait*. Donna met her students in the classroom and began by telling a story in French. Students responded in French and acted out parts of the story. Then Donna said she would write an outline of the story on an overhead transparency and that the students should tell her what happened and in what order. When the outline was complete, Donna asked which verbs were *passé composé* and which were *imparfait* and marked PC or I next to the corresponding word. She also asked how to make the verbs plural.

Donna then took her students to a nearby computer lab to practice *passé composé* and *imparfait* verb changes and conjugations using Lingo software. Lingo is a 14-year old DOS program (in Spanish, French and German) the school's technology person had enabled to work on the Windows computers. The technology person met Donna and her class at the door and made sure each student was able to access Lingo. He did not remain in the lab but was nearby and came into the lab several times. He not only made the Lingo program work but also had created short-cut icons so students could easily access Lingo. Donna gave each student a sheet of paper with rules for using *passé composé* and

imparfait. Donna walked around the lab helping students as they worked, answering their questions about the verbs and also about Lingo.

Ellen's Spanish III classes. Ellen had designed a WebQuest, posted on her web site, her students were to use to plan a trip to a city in Spain. Ellen met her students in the library computer lab to begin this research. She handed out the WebQuest describing the students' tasks, the process and how the project would be evaluated. Students were to work in groups of two or three. Each group was to pick a different city, find the required information (flight and hotel information, four tourist attractions and an authentic recipe) and create a presentation on the trip. The presentation was to be given orally in Spanish and include a PowerPoint, brochure, commercial or other visual aid approved by the teacher. All students chose to create PowerPoints.

On the first day in the computer lab, Ellen told her students to focus on their research and that the next day she would give them the guidelines for the PowerPoints. Students logged into the WebQuest on Ellen's school web site. The WebQuest contained links to sites students could use. After each group selected its city, students started searching on the listed sites or used Yahoo, Google, Priceline.com, Virtual Tourist, American Airlines or CyberSpain.com, for instance, to investigate airplane transportation. The students demonstrated they still had a bit to learn. One student wanted to know if ORD was Orlando. One student wasn't finding Seville. He was looking for Seville on a United States travel site rather than on a European site. The group researching Seville found a recipe for Seville orange marmalade and didn't realize it had nothing to do with the city in Spain. In this instance, Seville is a type of orange.

One student asked about the timing for leaving Omaha and arriving in Granada. One group had arranged for plane tickets to and from Valencia, with a round trip cost of $6,000 to $7,000. A girl questioned, "That seems like a lot." Another said, "Well, price doesn't matter." A boy responded, "Maybe that's because we're flying directly to the city. Would it be cheaper to fly to a larger city and then rent a car?"

As her students worked, Ellen walked around, observed, answered questions and provided suggestions. She commented on information students found and said, "You can probably link to that from your PowerPoint." When a student asked about PTAS, Ellen explained *pesetas* and said that Spanish people now use the Euro. Ellen recommended using an online money converter. Near the end of the period, Ellen told students that, since there was no school the next day, they would have three days at home to work. "If you're working on this tomorrow at home and having problems, just e-mail me because I'll be here and will check my e-mail."

On the day of their presentations, students brought food prepared from recipes they had found online. This food was to be shared with the entire class following the PowerPoint presentations given in the classroom. The PowerPoints were loaded, from floppy disks or school network, onto Ellen's computer. She advanced slides at the students' direction. Although Ellen had a computer in her classroom, she did not have a sophisticated projection system. Her computer was connected via Averkey to two medium-sized monitors in the front corners of the room. Students read from their notes or PowerPoint print-outs. More often than not, students faced the monitors rather than the audience. The text on many slides was difficult to read from across the room. Ellen

had created a scoring rubric for each presentation. This rubric included scores for content, visual aid, fluency and pronunciation but not on presentation skills such as facing the audience, speaking distinctly and maintaining eye contact. The visual aid and content counted as a group grade, with content counting the most. Students were graded individually on their pronunciation and fluency.

Mary's Japanese I class. Although Mary was disappointed she didn't have more technology to use with her Japanese I students, she integrated technology in a variety of ways. During a lesson on hobbies, Mary handed out pink sheets of paper with a story printed in Japanese. She asked the class what they thought the story was about. She pronounced the words and said the story was about looking at flowers. Mary read part of the story and asked students to read other parts. They read through the story together and looked up words in their textbooks and dictionaries. Then Mary played a tape of a popular Japanese song about cherry blossoms. Students listened to the music while they read. They were to write the words they found. Mary then told the name of the song. One boy said he had heard the song before. After she turned off the music, Mary explained the words. She asked students to translate. She then explained the significance of *sakura*—cherry blossoms blooming—an occasion when friends get together to look at the trees, eat, drink and sing. Mary passed around books and magazines about Japanese places famous for their cherry blossoms. She then gave each student a sheet of paper with the lyrics written in English. Students were to write the lyrics in *hiragana* while they listened to the song again.

To continue the emphasis on cherry blossoms, Mary handed out instructions for an Internet treasure hunt, a word jumble with eight questions about cherry blossoms. Mary took her class to the library computer lab to work on the treasure hunt. She had not provided web sites because she felt students knew where and how to search. She told them to think of key words to enter. Students used a variety of browsers: Yahoo, MSN Home Page, Hot Bot, Excite, Google and Alta Vista. Most students worked independently. Some asked other students where they found information. URLs were shared. Mary reminded students to be sure to figure out the final answer to the word jumble. Mary walked around, talking with students and explaining things they found on the Internet.

Most students finished in less than 20 minutes. As they finished, Mary talked with them about creating their own word jumbles and asked each to pick a topic from a list containing names of Japanese cities, places, seasons, cultural arts, food, pastimes and holidays. Each student told Mary what topic he or she chose. Several students began searching for their topics on the Internet. They were to have chosen their topics by the next class period. Students would have some time during the next two classes and homeroom in which they could work in the lab. Mary would reserve time in the lab because her students do not have study halls.

Before describing more activities, what they had in common and how they differed, let us consider the location of these activities and the types of technology used.

Location. Students were seldom observed using computers in their classrooms. The only time Rachel's students used a computer in her classroom was when they

showed their PowerPoints on the computer that had been mistakenly placed in the room for a few weeks. Ellen's students used the computer in her classroom to present their PowerPoint presentations. Each participant's room had a television monitor and VCR for watching videos of cultural activities or student created videos. Each teacher also used audiotape cassettes or CDs in her classroom. Two teachers introduced projects and activities in their classrooms before taking students to the computer lab to work.

Those classes in which students used technology for research or to create projects were held in some type of computer lab. All six participants had access to labs they could reserve for their classes, and did so for many of the observed activities. Mary, Ellen and Linda used labs in their schools' library media centers where technology assistance was readily available. In addition, Ellen took her students to an unstaffed lab dedicated to English and foreign language classes. Nancy's classes used a foreign language lab staffed by a full-time supervisor and, sometimes, an additional technology assistant. Rachel and Donna used labs in their schools' computer centers; however, these schools' labs differed quite a bit. The labs in Donna's school were staffed by a person who assisted both teachers and students and who seemed to enjoy working with Donna and her students. On the other hand, even though technology personnel worked in her school's computer center, these people seldom assisted Rachel or her students. In addition to the two labs in the computer center, Donna could take her classes to the library's computer lab or to a special presentation lab equipped with a projection system.

At times, a few students or even another class worked in the lab in addition to the class being observed. This did not create any problems for the teachers or students. In

the labs, students created and gave PowerPoint presentations; created videos; used Inspiration software; worked on lessons, activities and projects; and did a lot of Internet research.

Technology used. The technology used by students included PowerPoint, videocassette recorder, video camera, digital camera, CD-ROM, Inspiration graphic organizer software, iMovie digital video editing software, drill and practice software, word processing, audiotapes and CDs, e-mail and the Internet.

Types of activities. Several types of activities were described by teachers and/or were observed, the most prevalent of which involved use of the Internet in a variety of ways:

- Internet research
- WebQuests
- Internet research to find information to use in PowerPoint presentations
- Internet research to find information to create a booklet
- Internet research to find information to use in creating a video
- Using the Internet for grammar and vocabulary practice
- Using the Internet to do assignments
- Using the Internet to do oral assignments
- Taking quizzes on the Internet
- E-mail pen pals
- Teacher web sites.

Internet research. In their interviews, all six teachers described how their students used the Internet. In addition, students of all six teachers were observed doing Internet research, mostly to find information on the culture they were studying. The research topics included:

- History of the Mayas
- Information on German schools
- Holidays in Japan, Germany and Spain
- German movies and restaurants
- The Euro (adopted just a month before this study)
- Current events in Peru
- Virtual shopping—Gallery Lafayette
- Planning a trip to France or Spain
- French provinces, German states and Japanese prefectures
- French rail system (SNCF)
- Leisure activities in Japan
- Latin American art and music.

WebQuests. Four participants either described or were observed working with their students on WebQuests (inquiry-based Internet research activities created by these and other teachers and often shared with colleagues via the Internet). The common components of WebQuests include a task, background information, a list of sources with links to web sites, and a description of the process to be used. In a scenario presented above, Ellen's Spanish III students used a WebQuest to plan a trip to a city in Spain.

Linda described how she had designed WebQuests for her Spanish IV students. The focus was to answer a question such as, "Why did the Maya disappear?" or "Is the Amazon rain forest really endangered?" Students had worked on an AmazonQuest as part of their culminating project. They went through prescribed steps, found information on web sites Linda had listed and created a video presenting different perspectives on the Amazon rain forest. Students had to assume different roles—an environmentalist or a politician, for instance—and reach consensus about whether or not the president of Peru should initiate changes in how the rain forest was used.

Rachel said she had created a WebQuest on the new Euro. Donna's French I and II students worked on a EuroQuest she had obtained from the Internet. This activity was observed in March 2002, shortly after the Euro had become the standard currency for 11 of the 12 members of the European Union. The EuroQuest provided directions and 22 "nuts and bolts" questions, all of which each student could answer by using web sites listed in the resources section of the EuroQuest. These questions included, "What countries use the Euro?" "How many U.S. dollars is one Euro worth?" and "Where will Europeans get the new Euros?" Students simply had to find these answers, copy and paste them below the corresponding question in a Word document. Once students found the answers to these questions, they could begin on the five "deep thought" questions; however, they were not expected to complete this section during class. An example of these latter questions was, "How will the changeover effect [sic] businesses and/or governments in non-EU (European Union) countries?"

Donna introduced the EuroQuest in her classroom before taking her students to the computer lab. While her students worked, Donna walked around the lab assisting them with an online conversion chart, demonstrating security measures incorporated into the Euros, and answering questions. As her students left the lab, Donna said, "This was such a great activity...and the teacher who created it shared it with everyone on the web." In a follow-up e-mail, Donna said she planned to show her students a short video about the Euro and would also discuss the deep thought questions with her students. Information about the Euro would be included on the culture section of the final exam; students would not have a separate test on the Euro.

Internet research to find information for PowerPoint presentations. Three teachers had their students locate information on the Internet to use in creating PowerPoint presentations. We have already seen how Rachel's French I students found information and graphics on the Internet and incorporated them into virtual travel brochures about Parisian monuments. These French I students were also observed finding Internet graphics to insert in PowerPoint presentations portraying conversations between a customer and a server in a French restaurant or café. Rachel's French II students used the Internet to find information for PowerPoint presentations. One activity required students to use vocabulary words and specific verb tenses to illustrate "*C'est pas mon jour*" (It's not my day)—how things didn't go as planned on a specific day. Three weeks later these French I and II students created presentations on Loire Valley *châteaux* incorporating information they found on the Internet.

Ellen's Spanish III students created PowerPoint presentations using information they had located when planning a trip to a Spanish city. Her Spanish II students had found information and illustrations on the Internet to create presentations on holidays and celebrations (e.g., *El Dia de lost Muertos*, and *La Fiesta de San Fermin*) in Spanish-speaking countries.

Donna's German III students were observed researching different German states, using this information to create PowerPoint presentations and then giving those presentations to the entire class. Donna said her students had previously conducted Internet research on specific countries, cities or areas to create a travelogue that would include various tourist highlights, historical points and travel plans. These travelogues could have been presented using PowerPoint. She described how her French IV students had done Internet research and then created PowerPoints to illustrate selected portions of *Le Petit Prince.* These students were reluctant to read the entire novel in French; however, by assigning each pair of students a chapter or planet, Donna engaged the entire class in learning about the story, its morals and stereotypes. Donna also said she had had her German III students write an original story in the past tense, illustrate it with graphics found on the Internet, and then present that story to the class.

Internet research to find information to create a booklet. Donna introduced French provinces to her French II class by reminding students they had already learned about Paris and then showing 10 minutes of a video in the classroom, pausing the video occasionally to pronounce important geographic names and explain about items such as the Chunnel between France and England, major rivers, and the French Revolution. She

explained how many French people still think of themselves as living in provinces even though they no longer officially exist and the country is divided into regions and departments. Donna told her students they would research the three best-known provinces: Normandy, Cote d' Azure and Loire Valley, and create booklets as their final products. Throughout her introduction, Donna expected her students to take notes. Her instructions included a schedule for what students would be doing for the next nine days (not all of it focused on this project), and included the point values for each aspect of the project. Donna said that with both the German state and French province projects, prior to her school's having Internet capabilities, she simply would have taken her classes to the library and searched in traditional print resources for information for these projects.

Internet research to find information to use in creating a video. Although this activity was not observed, Linda described how she had her Spanish students use information they found in an AmazonQuest to create videos giving different perspectives on what should be done about the Amazon forest.

Using the Internet for grammar and vocabulary practice. Three teachers said their students had used the Internet to practice grammar and vocabulary. Linda mentioned having done this the previous semester. Donna and Ellen had used Quia, a commercial web site that provides activities, quizzes and games. Teachers can use Quia templates to create their own activities or can use those listed on the web site. These activities are listed by grammar and vocabulary concepts. In addition, when teachers use Quia, they can indicate the textbook series for which they would like to find activities. Donna's French and German students used Quia at home or at school for independent drill and

practice of vocabulary and grammar; however, she seldom has all students in a class using Quia at any one time because it can be slow with too many simultaneous users. A few of Donna's advanced students used Quia when they had completed another grammar activity before other students had finished.

Ellen also said her students had used Quia at school and at home for grammar and vocabulary activities such as flashcards, Hangman, Concentration, Jeopardy and challenge boards. She had frequently created mini-quizzes for students to use when reviewing for tests. "Students can work in the areas that they need the most work on...they can work individually or they can work in teams."

Using the Internet to do assignments. Two teachers had their students complete assignments using the Internet. Nancy's first year German students were required to spend one period a week doing an activity, either something she had designed or a textbook ancillary. Students completed these assignments on their own time, generally without Nancy present, and had to turn them in to Nancy. Students could access textbook ancillaries such as CD-ROMs via Blackboard, which was widely used in Nancy's school.

In previous years, Ellen's Spanish II students had used WebCT for assignments but now used Blackboard for this purpose. For vocabulary review, students looked at vocabulary, listened to Ellen's pre-recorded pronunciation, took notes, did an activity and orally recorded their answers. The activity observed was one in which students looked at notes on commands. The notes were simply PowerPoint slides Ellen had created and linked to Blackboard. Students practiced proper verb commands and later took an online quiz over them.

Using the Internet to do oral assignments. Ellen was the only teacher who had done this. In the past she had used PowerPoint to present grammar information to her class but now delivered those PowerPoints via Blackboard to introduce vocabulary and grammar. Ellen stated:

> The vocabulary introduction is very easy. I have a picture or a word, and then I pronounce it. I have that pre-recorded so I don't have to do that each class period. So they listen to that a couple times through.

Ellen's students used microphones and headsets to listen and respond to prompts. She felt one advantage was that Blackboard allowed students to work at their own pace.

Taking quizzes on the Internet. Linda mentioned that in the past her students had used Quia to take online quizzes, but this was no longer being offered because of cost. The previous semester Ellen's students had taken quizzes using Quia. This semester, however, Ellen's Spanish II students who had worked with commands online the week before, were observed taking an online quiz. This was the third time they had taken a quiz via Blackboard.

E-mail pen pals. As previously described, Nancy's German III students used e-mail to communicate with pen pals in Germany. She had her students do this in the school where she had previously taught and was the only teacher who mentioned having students use e-mail.

Teacher web sites. Only two teachers mentioned this. Linda utilized Whitegoose.com to post dates of quizzes and tests and due dates for projects but not for regular assignments. Students and parents could sign up to be on a mailing (e-mail) list

to receive reminders about due dates. The previous semester very few people had utilized this service. At the time of her interview, nearly half-way into the semester, no one had used the service during the current term. Ellen had created a web site that could be accessed through the school's web site and contained resources her students could use; however, less than one-third of her students had done so. She said once she gets more information on the site, "It'll be easier for them to go and access it, but right now it's just pretty basic in what they can access."

Creating PowerPoint presentations. Five of the six teachers required their students to create PowerPoint presentations on a variety of culture, grammar or vocabulary topics. Some of these have already been mentioned. Rachel's French I and French II students created PowerPoints focusing on grammar and vocabulary concepts from certain chapters in the text:

- *C'est pas mon jour* (Using compound past tense verbs, explain why things did not go right on a certain day.)
- Demonstrate a conversation between a customer and server in a French restaurant or café.
- Describe daily routine, using transition words such as next, first and then, and utilizing present and past tense verbs.
- Explain likes and dislikes.
- Given starter sentences, insert adjectives and complete the sentences.

Linda had her students create a storybook using PowerPoint. Another project required students to illustrate a song on racism. All students worked individually or in pairs on different verses of the same song. Each student or pair of students interpreted the song differently and showed the PowerPoint to the entire class. Although her students had imported sounds into their PowerPoints, Linda had not yet had them record their own voices.

For the most part, Ellen's students created PowerPoints as visual aids for oral presentations on Spanish culture, most recently on holidays and celebrations in Spanish speaking countries and on a trip to Spain.

At one time Donna asked her students to write original stories and show them on PowerPoint slides. Each student was to be in the fairy tale, so he or she had to include his or her picture on the slides. Each student needed to make decisions about the characters and inanimate objects and record his or her voice to narrate the story.

Although Mary had not yet had her students create PowerPoints, she planned to do so in the near future. She explained why she was thinking of having each student pick a Japanese place:

> I find that the kids, even though they're learning Japanese, still have a lot to learn as far as the country and culture and certain cities and geography. I want them to focus on a certain city, certain aspect of culture, and do a presentation using PowerPoint and links off the Internet.

Listening and grammar activities on CD-ROM. Using CD-ROMs for listening and grammar activities was mentioned by or observed for three teachers. Textbooks are

often accompanied by ancillary CD-ROMs that include a variety of activities and games. For instance, the assignment Nancy's German I students did during one lab period consisted of five parts, all included on the CD-ROM:

- Tic, tac, toe game
- Concentration game on clothing items
- Listening activity in which students listened to a conversation about clothing and then clicked on the appropriate picture on the monitor. The software kept track of the student's score while he or she wrote phrases on a worksheet.
- An exercise in which students matched phrases and sentences about clothing, also using pronoun substitution.
- Writing a short paragraph about the clothing the student was wearing.

Nancy's students had not performed well on the previous CD-ROM activity, so she had them work on this activity—noun and pronoun agreement (*die, den, das, eine, einen*) again. One student who finished early created a crossword puzzle of clothing and colors vocabulary using Puzzlemaker.com.

Both Nancy and Linda had their students listening to native speakers on CD-ROM. Some of Mary's students had purchased their own Japanese CD-ROMs (language learning programs and video games) and had brought them to class to use.

Drill and practice software. Although use of drill and practice software is not as prevalent as it once was, two teachers included it in their students' activities. Some CD-ROM activities, such as electronic flash cards and vocabulary exercises, were drill and practice. Nancy's students had also used Idiom Play/Word Tutor software.

Donna said she had used drill and practice software for grammar review. She had enough flexibility that if students were having difficulty with a grammar concept, she could take them to the computer lab to practice. She used Lingo (available in French, German and Spanish), a 14-year old DOS program the school's technology person had enabled to run on the school's newer network and Windows computers, with both her French and German students. She said she never used Lingo to introduce a concept but had students use Lingo if she felt they needed repetition. Donna's students were observed using Lingo to practice *passé composé* and *imparfait* as an extension of other classroom activities. As students typed the correct form of each verb, the computer kept track of their correct and incorrect answers.

Interactive software. Donna also mentioned using interactive language learning software such as *Where is Oscar Lake?* and *Le Petit Prince*; however, the use of these was not observed.

Word processing. Although most students in these six schools use word processing in one way or another, only three teachers specifically mentioned this technology. Ellen expected her students to use word processing to write papers. Donna required each of her students to turn in a 200-word essay every other week. Students had to write using a word processor outside of class. In addition, each junior student was required to write a research paper for his or her English teacher and for a teacher of another subject. The English teacher focused on writing; the other teacher, sometimes Donna, focused on content.

Still camera. Mary was the only teacher who mentioned using a still camera. Her Japanese students had used it for a scavenger hunt and to make travel brochures.

Listening activities utilizing audio cassettes or CDs. Rachel, Linda, Nancy and Mary each described how their students listened to native speakers on audiocassettes or CDs. Sometimes teachers used these textbook ancillaries to introduce or practice vocabulary, practice verb tenses or practice conversations. These activities seldom lasted more than a few minutes. For instance, during Mary's Japanese I class, the total amount of time she played the audiocassette was 15 minutes; however, she stopped the tape several times for students to repeat what they heard. Listening activities were just one of several activities teachers used to focus on certain vocabulary or grammar concepts. For the most part, entire classes participated in these listening activities. In Linda's Spanish III class, however, listening to an audiocassette was one of three classroom activity stations she had set up for students to learn about Mexican art and music.

Mary said she had taped her students "so they can hear their own voices and work on their accents and hear their own pronunciation mistakes because it's easier for them to hear it from their own voices." Although many years ago she had taped her students, Nancy said she no longer does this because "foreign language education, since technology came out, does not focus so much on pronunciation."

Video activities. All six teachers used videos in their teaching. As with the audiocassettes and CDs, many of these videos were textbook ancillaries. Nancy said she used a 25-30 minute video to introduce a chapter to her German students and then would have her students watch different listening activities throughout the chapter. Linda had

her Spanish students watch video clips about Latin American music and answer questions, incorporating subjunctive mood, on their worksheets. Mary's students watched short video clips about hobbies, games and related activities. Ellen's students watched episodes of a video on the lives of Mexican teenagers.

Some teachers had purchased videos for their classes. Nancy had purchased German versions of movies or cartoons for her students to watch, especially on days when class periods were unusually short. Rachel showed her students a French version of *Beauty and the Beast* because it helped keep her students engaged on the day before break. She said many students had already seen the English version and "it's a way for them to hear the story in French and recognize the words."

When she visited Japan, Mary had taped various aspects of Japanese culture and later used these videos with her students because they would learn from videos much better than from just Mary's telling about the culture.

Linda, Donna and Nancy had each videotaped their students acting or speaking in the target language. Donna's mime a crime activity in her French III class has already been discussed. Nancy occasionally videotaped her students or gave them a large project in which they created a video outside of school. She said, "About once every semester I have the students do a project with the video camera where they video each other doing...acting out some kind of scene or interviews...."

Linda's Spanish IV students produced short public service announcement videos to accompany their oral presentations on the pros and cons of a social issue. She said the current textbook chapter emphasized the "identification and discussion of social

problems, how to solve them, how things might be different if 'hypothetical situation' were to occur, how things will be if nothing is done." Linda continued, "Doing the PSA was chosen to add variety, broaden their exposure to technology, and make them really think and take ownership of the project....It brings everything together nicely."

Because Linda's class was a small, it contained just three groups of students. She had introduced this project several days before her classes were observed. The groups were to videotape scenes and research their topics outside of class. Linda then met her class in the library's computer lab where a technology specialist taught Linda's students how to use iMovie. Linda was quite knowledgeable about this editing software herself so she could help students as they worked. Together Linda and the technology specialist led the students through the process of editing a digitized video *Caperucita Roja* (*Little Red Riding Hood*), rearranging scenes, adding transitions and effects, writing subtitles and coming up with a title. Teaching iMovie in this manner prepared students to edit the videos they had taped and condense each segment to just 60 seconds. A week after the students were introduced to the iMovie software, they returned to the lab to edit videos they had taped, add captions, music and credits. During the next week students gave their oral presentations in class, incorporating the public service announcement videos.

Radio programs. In the past, Linda's Spanish students had created radio programs on different professions, radio advertisements or public service announcements. She had replaced the radio activities with video activities.

Graphic organizers. Linda was the only teacher who mentioned using any type of graphic organizer software. Her Spanish III students used Inspiration to organize

information for presentations comparing themselves with characters from legends. This activity was described earlier.

We have described how teachers used technology for management and/or instruction. We have also described how technology was integrated into the learning process, the types of activities in which students were engaged, the location of these activities and the technology used. Let us also examine the behavior of students when they used technology, the quality of student work, how students were held accountable for their learning and the amount of time spent inside and outside class on technology projects.

Student behavior. How did students behave when using technology? Behavior is discussed in terms of general behavior in the lab or classroom, collaboration, how students used their time and how they presented themselves.

Behavior in classroom. Students were observed using technology in their classrooms less than when they worked in computer labs. When they were observed in their classrooms, they were watching and/or listening to videos, audiocassettes, PowerPoint presentations or oral presentations. Nothing in the students' behavior seemed different than what one would observe in a classroom where technology was not being used. For the most part students were well behaved. While Rachel's students gave their Parisian monument PowerPoint presentations, other students were attentive. They watched and took notes even though they talked and asked questions. Linda's Spanish III and IV students were engaged in activities whether they were simply watching fellow students present, participating in a variety of teacher-led grammar and vocabulary

activities, working at learning stations or watching video clips of Mexican singers. Both Donna's and Mary's students were well behaved in the classroom. Ellen's students were polite and attentive while groups gave their PowerPoint presentations on Spanish holidays and trips to Spain. When Ellen showed video clips on Mexican teen life and paused to ask questions about the video, students were very hesitant to respond. Nancy's students were not observed in the classroom, only in the computer lab.

Behavior in computer lab. For the most part, when students of all six teachers worked in computer labs, they were considerate and engaged in the task at hand. Having to talk with students about behavior or reminding them about being on task did not seem to occur more frequently just because the students were in the lab. Although some of Rachel's students talked while they created their PowerPoints, they were focused on making unique, colorful backgrounds and fonts, typing text and inserting graphics. Students referred to storyboards they had made prior to working in the lab. When Nancy's entire German III class wrote e-mails and attached their photos, students worked enthusiastically and enjoyed the process.

Linda's students worked productively in the lab. Linda had planned these activities very well, had given students explicit instructions (oral and printed), and worked closely with students. If she had any inkling students might not be on task, she talked with them immediately. She was disappointed in one group of girls who came to the lab unprepared (they had not taped their video ahead of time as required) to edit their public service announcement video. They worked on an alternate activity related to the project; however, they did not seem as engaged as they should have been. Students

searching for legends and using Inspiration were engaged and seemed to be enjoying their work.

When Donna's German and French classes worked in the lab, they usually worked independently and diligently. Students talked a lot, but they were not disruptive. They helped each other, answered each other's questions and asked questions of Donna. When the French class worked with Lingo software, two students were observed just sitting and talking until Donna intervened. When asked about this, Donna explained that these two students had already completed two years of Spanish, were very bright and had finished the Lingo exercises in a short amount of time. She accommodated for their abilities by suggesting they work on similar online activities available from Quia. This seemed to provide enough challenge for them.

Both of Ellen's Spanish III classes diligently searched for information to use in planning their trips to Spain. Throughout each observed class period in the computer lab the groups were seriously analyzing, printing and organizing information they found. The atmosphere through the entire period was positive. Students were polite, engaged and helped each other. The same could be said of Mary's Japanese I students when they worked in the computer lab.

Student use of time in computer lab. For the most part, students in the computer labs used their time wisely; however, this was not always the case. One boy in Rachel's French II class did nothing during the entire class period. He wasn't even logged in. At the end of the period Rachel explained that this boy had already finished his project and

she would give him extra work the next day. A girl in the same class had not selected her *château* by the end of the third day in the lab.

One boy in Nancy's German I class, was required to stay in the lab the entire period, finished his assignment and asked for extra credit work. Nancy said she did not have any for German I. The boy asked if he could make a crossword puzzle. Nancy approved, gave him the web site for an online crossword puzzle maker and suggested he include the clothing and colors vocabulary the class was studying. Nancy had some of her students repeat a CD-ROM grammar review (textbook ancillary accessible via Blackboard) on noun and pronoun agreement because they had not completed it correctly the week before.

Two German I students worked on their grammar review assignment during their required weekly lab period. This was during the students' free period, but Nancy was not present because she was teaching in her classroom. The first boy finished an activity on colors and clothing. He recorded his score on paper then worked on a flashcard activity using Word Tutor/Idiom Player. When a German word or phrase appeared on the screen, the student was to write the words he missed, but he did not write all of them. If he did not know the answer, he would just click on "see answer" and then typed what he read. He typed so fast that he had many spelling errors. Less than half his answers were correct. The other boy was doing the same exercises in a haphazard way and he, too, answered only half the answers correctly. Neither boy seemed to care about what he was doing. In fact, when the lab supervisor left the lab for five minutes, the first boy searched Yahoo for automobiles and checked his personal e-mail. As soon as the supervisor

returned, he closed Yahoo and went to an Internet computer game. When the supervisor asked him if he was doing school work, he said he was not. He browsed through his folders list on the server and was just marking time until the bell rang.

Ellen's Spanish III students managed their time well when they researched their trips to Spain; however, when they researched the Mayas, they finished rapidly. Then some of them played an Internet marbles game, opened their e-mail, talked or listened to music on Windows Media Player. Ellen did not approve of these activities. In fact, she told the students not to do them. After the class left, Ellen said, "This class always gets done so much earlier than the first period class." Ellen's Spanish II students were in the lab to work on commands using grammar activities on Blackboard. During this time Ellen met each student, one at a time, in the hall outside the lab for an oral assessment. Students were to have prepared for this. They worked individually on the computers but also talked with each other about their oral assessments.

Even though Linda's students worked well in the lab, she monitored them closely reminding them, for instance, "It's going to take you at least four days to edit, so you'll need to plan your time." She frequently announced how much time remained in the period.

In Linda's Spanish classes, some students didn't plan their lab time well. They spent too much time on the first two parts of their assignment and did not have enough time to complete the last part. Linda labeled these students "perfectionistic." She said, "The time frame was fine so long as they worked well in class. And then there were some kids who didn't work well, didn't follow instructions, either....They lost some

points on that." Rachel's students were observed spending a lot of time on the technology but not enough on content. Rachel said they didn't use their time effectively because they didn't realize how long things would take. Several of Rachel's French I students spent a great deal of time on backgrounds and special effects but had little or no time left for text. For instance, by the end of one class period, one boy had completed only two slides, another had not typed text on any slides, and a girl had created a different background for each of her slides. Rachel's French I students differed noticeably from her French II students in how they used their lab time. Students in both classes were mostly ninth graders; however, those in French II were the upper ability students who had begun French in eighth grade. The French II students were more on task, finished their work earlier and could proceed more independently.

Collaboration. Collaboration among students was observed in all classes as they worked in labs. Students collaborated on technical processes as well as content. Rachel's French students helped each other locate different fonts and animated graphics and save their PowerPoints to the correct folder on the server. Donna's German students helped each other with web sites and shared information. Her French III students helped each other with tasks such as making accent marks, interpreting on-screen tutorials and finding web sites. When her French I students worked on the EuroQuest, they helped each other find web sites and answers. Similarly, Ellen's Spanish students helped each other navigate through Blackboard and assisted in interpreting content. As pairs of her Spanish III students searched for information on the Mayas, they read and discussed together, figured out answers, helped each other translate. One student almost sounded

like the teacher when the student said, "Now do you see any information in the picture that could possibly pertain to the question?" When Ellen's Spanish III students used the WebQuest to plan a trip to a city in Spain, students had deep discussions about details. In one group, students discussed what "return" meant on airline web sites—whether it is when a person leaves or when that person arrives home. One group was trying to decide if a $6,000 or $7,000 round trip ticket was too expensive and figure out a less expensive way to travel. Mary's students shared web sites.

How students presented themselves. Students of four teachers were observed giving presentations to their classes. Donna's German III students gave their PowerPoint presentations in a special presentation room, a lecture room larger than a regular classroom and equipped with a projection system. As each student spoke about his or her German state, another student advanced slides on a computer located on the side of the room. The student who was presenting stood in front of the room, to the side of the large white marker board where the image was projected. The speaker was able to point to things on the slides but still face the audience sitting at long tables in the middle and back of the room. The images were easy to see and the text easy to read from anywhere in the room.

As each student presented, he or she stood beside the projected slides. Some students referred to their notes frequently while others barely glanced at notes. Students maintained good eye contact with the audience, spoke clearly and loudly, and answered Donna's questions.

In most of the observed classes, students gave presentations in their regular classrooms. PowerPoints were shown on one or two cart-mounted television monitors in the front of the room. During those few weeks when a computer was stored in Rachel's classroom, her students gave their Parisian monument and *C'est pas mon jour* presentations in the classroom. Rachel asked students to rearrange their chairs so they could see the television monitor on top the computer cabinet. As each student presented he or she stood next to the monitor, used the mouse on top the cabinet to advance the slides. These students faced the monitor to see their slides and manipulate the mouse; therefore, their backs were turned to most of their classmates. In addition, these students spoke so softly that they could not be heard by everyone.

None of Linda's students were observed giving PowerPoint presentations. The only presentations observed in which technology was part of the presentation itself were the Spanish IV public service announcements. These 60-second video clips, one pro and one con, were just a short part of each presentation and were shown either before or after the students spoke. Therefore, students did not have to look at the monitor while they spoke to the class. Each presenter sat in a tall chair, which seemed to be the designated teacher/presenter spot in Linda's classroom, and faced the rest of the class, sitting along three sides of the room, while he or she spoke. Each student could refer to one small note card. Some did; others did not. The students spoke clearly. Several were fairly fluent. Some had better eye contact than others. Although Linda's Spanish III class had used the Internet and Inspiration to research and organize their legends presentations, they were not given using technology. Each student had made a poster as a required visual aid

comparing himself or herself with a character from the legend. Again, each student could refer to a small note card. A few did; however, they were not focused on their note cards. Most of the students faced the class while they spoke, pointed to specific things on their posters and spoke clearly and fluently. One girl's poster was a Venn diagram.

In her classroom Ellen had two cart-mounted monitors connected by Averkey to the computer on her desk. Students' chairs were arranged along three walls, forming a large U, so students could easily see at least one monitor. After each group loaded its PowerPoint presentation (Spanish holiday or trip to Spain) on Ellen's computer, that group stood in front of the room to present. One student in each group signaled to Ellen to advance the slides. For the most part these students, also, faced the monitor, rather than their classmates, when speaking. They maintained better eye contact than Rachel's students did but still mostly read from their notes. One group sat on a table in the middle of the room while they narrated.

Quality of work. The quality of student work varied. Donna's German III students' PowerPoints were generally well-prepared and fulfilled project requirements—a map, coat of arms, at least six slides, tourist attractions and lodging. Their slides were attractive and easy to read from a distance. One boy had become so enthusiastic about his research that he had difficulty limiting the length of his presentation. Although he had only four slides, his presentation lasted 30 minutes. One girl had eleven attractive slides containing many pictures. Her presentation exceeded the requirements; however, she spoke very little in German. Donna said this girl would lose points on that part of the scoring rubric.

Some of Rachel's students did not fulfill all requirements. A few students forgot to include the URLs from which they had retrieved Parisian monument information. One boy used fancy backgrounds and fonts, but his slides contained no pictures. Ellen said several of her Spanish II students had given incomplete or inaccurate information. Their slides, even on the television monitors, were difficult to read unless the viewer was sitting near one of the monitors. Some graphics did not match the information being presented. Some of Ellen's Spanish III students had created easy-to-read slides while others had colorful slides with very small text and/or colored text that was difficult to decipher on a colored background (e.g., small white text on bright red background, blue text on hot pink background).

Time during and outside class. The amount of time required of students to use technology for their projects during and outside class varied. Several teachers said their students did all their work during class time. Donna said this varied even within her classes. The earlier *Le Petit Prince* presentations had taken 2 days to create and 3 days for all students to present. Both her French province and German state projects (using information from the Internet to create a brochure) took parts of 3 days in the computer lab over 2 weeks. Rachel's French I students had worked on their first Parisian monument PowerPoint presentations for 3 days and presented for 1 day. These same students, within 1 month, worked with the same material to create virtual travel brochures (PowerPoints) in the lab for 4 days—3 creating and 1 presenting. For their *C'est pas mon jour* PowerPoints, Rachel's French II students spent 1 day in class making storyboards, 2 days in the lab creating the PowerPoints, and 1 day in class presenting. Likewise,

Rachel's French II students spent a total of 4 days in the lab on their *châteaux* projects. Ellen's Spanish II students spent three class periods in the lab researching and preparing their slides on Spanish holidays. Mary reserved parts, but not all, of three class periods and homeroom for her Japanese I students to work on their Internet brainstorms (treasure hunts they created themselves).

While most classes did all their technology work during class time, some did not. Linda mentioned:

> A lot of times I have them doing [their projects] on their own but give them time within class to work on them. There are other projects where I give them the directions and it's completely on their own outside of class.

She said it took a lot of time for her Spanish IV students to create their public service announcements using iMovie. Because of the amount of time required, she had them do part of the work outside class, "partly because I couldn't get the lab and they had to work on those computers because we didn't have enough server space for them to be able to work in other places." Students were to shoot raw video footage outside class. They had two days in class, was well as any free time, to learn how to use iMovie by working on the *Little Red Riding Hood* model. Similarly, Linda had reserved the lab for her Spanish III students to do their legends research and organize the information using Inspiration, but she said they could also work during their free periods. Donna said that, although her German III students had just three class periods to work on their German state presentations, they could do some of the work at home. Ellen expected her Spanish III students to work on their trip to Spain WebQuests outside class and suggested that

students work at home on a teacher work day when classes were not held. "So if you're working on this tomorrow at home and having problems, just e-mail me because I'll be here and will check my e-mail."

Accountability. How are students held accountability for their learning when technology is integrated into instruction and learning? Although these teachers used a variety of methods, the one thing they had in common was that they all held their students accountable.

Rachel's French I and II students had to answer questions on a worksheet while watching a video on Napoleon. A few questions about the video were to be included on final assessments. Linda's Spanish III students also had to complete worksheets while watching Mexican singers on video clips. Similarly, Donna's French and German students had to take notes, sometimes using a graphic organizer, while other students presented.

Several teachers included questions about student presentations on quizzes and tests. Rachel reminded her French I students they should take notes over the Parisian monument presentations because the information would be on a test. Donna's students were to take notes on the German state presentations. Her students would be quizzed on the information and some of it would be on the culture portion of their final exam. Her French students would not only have a test over the French provinces but would also evaluate each other's booklets. Her initial instructions about this project included requirements, web sites for starting research, a schedule for the next two weeks identifying when the students would work in the computer lab, and possible points for the

evaluations. The ongoing practice (through mime a crime, Lingo software, and other activities) of *passé composé* and *imparfait* would be included on short quizzes and tests. Following the EuroQuests, Donna planned to show a short video and discuss the Euro with her students, especially the deep thought questions. Although these students would not have a separate test over the Euro, this information would be included on the culture section of the final exam and perhaps on the chapter test.

Both Donna and Ellen had created rubrics for evaluating student presentations. Donna's rubrics were attached to the initial project instructions and were very specific in what they included. When she introduced the German state project, she went through the instructions and rubric, reminding her students that the cultural contributions of the state counted the most. Her rubric included scores for content (geography, history, industry, culture) as well as meeting deadlines and managing class time, quality of the oral presentation (word choice, spelling, pronunciation, delivery) and the PowerPoint slides.

Ellen's rubric for the Spanish holiday PowerPoint presentations included just two categories: completeness of information and whether or not students used a visual aid. No consideration was given to quality of the visual aid (PowerPoint). Nor were there points for oral presentation. The rubric for the trip to Spain presentations included scores for content, visual aid (all PowerPoints), fluency and pronunciation. The visual aid and content counted as a group grade. Content counted most. Students were graded individually on pronunciation and fluency. Following the last presentation, students voted for the two best presentations and were required to explain why they voted as they did. Presentation skills—facing the audience, speaking distinctly, not just reading,

maintaining eye contact—were not included on the rubric. Ellen said she was mostly interested in the information students gathered, not on how they presented. "I think doing a PowerPoint makes even a sloppy, horrible presentation look presentable....With inaccurate information they make it look nice. Look like they did a really good job and spent a lot of time on it, when actually they didn't."

Donna and Linda gave their students the grading criteria at the beginning of their projects but did not use rubrics, per se. When Linda's Spanish IV students began learning how to use iMovie to edit *Little Red Riding Hood*, she gave them instructions, written in both Spanish and English, stating what students were to do with *Little Red Riding Hood* and with their public service announcements, giving the schedule for how and where the class would work for the next four weeks, and stating that the students' grades depended on following instructions, a finished product shown on time, creativity, and proving that they could use iMovie. The final evaluation form included:

- Visual aid (video) (main idea, was it useful, why?)
- Presentation (introduction, problem statement, solution, conclusion)
- Citation given for sources
- Choice of sources
- Ability to persuade.

When her Spanish III students gave their legends presentations, Linda gave them points in the following categories, with content and grammar counting the most:

- Presentation (content, grammar, comprehension and pronunciation, vocabulary)

- Visual aid (attractive, usefulness/satisfies requirements)
- Overall (flow, preparedness, use of visual aid).

Linda's Spanish III students' legends presentations counted as a test grade. She said the oral presentations that accompanied the public service announcements given by her Spanish IV students would be used as an oral assessment:

> I evaluated their use of the language, accuracy and advanced grammar That we've been working with in the last chapter. In addition to the pronunciation and their flow and if they really did make a point or where they just kind of got up there and said some things and hoped that everything would go together nicely.

Organization of class. Five of the six teachers said when their students worked with technology, they often worked in pairs or small groups. This was frequently observed. Linda's Spanish IV students worked in pairs or small groups on their public service announcements. Her Spanish III student worked in small groups at activity stations in her classroom. Donna's students worked in small groups on their mime a crime videos. Ellen's Spanish III students worked in small groups to plan their trips to cities in Spain. Her Spanish II students also worked in small groups to research Spanish holidays, create PowerPoints about the holidays and present them to the class.

Activities typical? When asked if the observed activities were typical, all six teachers responded positively. Rachel said her students often used PowerPoint, but the topics change. Nancy said although she doesn't have a computer in her classroom, her students use the lab quite a bit and "I think you saw a pretty good cross-section of the

kinds of things we do with computers." Linda responded, "Pretty much so. I've always tried to combine the technology with some sort of presentation and try to include the use of technology with either the acquisition of a language skill or vocabulary—the practicing of it." Donna said the observed activities were "pretty normal." Ellen said, "I've used all of these activities before in my classes and found them to be pretty successful." Mary responded, "I didn't do anything I really haven't done before. Pretty much everything was typical." She said that throughout the year, she had pretty much used videotapes, audiotapes and the Internet. "I haven't used anything else."

Frequency of activities. Teachers were also asked about the frequency with which they used technology activities. Not all teachers responded. No teacher responded for every technology. Responses varied.

- Video
  - Weekly (2)
  - With every chapter (1)
  - Periodically (1)
  - Big project videos—once a semester (1)
- PowerPoint
  - Once every three to four weeks (1)
- Audiotapes or CDs
  - Practically every day (2)
  - With every chapter (1)
  - Every week (1)

- E-mail pen pals
  - Once every two weeks (1)
- Internet research
  - Every two or three weeks (2)
- Internet grammar work
  - Once a week (1)
  - Two or three times per chapter (1)
- Drill and practice software
  - Once a month (2)
- Big projects like using iMovie or Inspiration
  - Once a semester (1)
- Teacher presenting with technology
  - Twice a week, more or less (1)

This section commenced with several scenarios describing how students used technology. To describe these activities in detail, we looked at the location where the activities occurred, the types of technology used and the types of activities taking place. We also considered how students behaved when using technology, how they presented themselves, and whether or not they collaborated with each other. The quality of their work was considered. The section discussed the amount of time students spent on the activities inside and outside class. The section also discussed how teachers held their students accountable for their learning when technology was integrated. And, finally, the

section examined class organization, whether or not the observed activities were typical, and the frequency with which these teachers used technology.

Teacher's Role When Students Use Technology

What were these teachers doing when their students used technology? What was the teacher's role? How much guidance did the teachers provide for Internet searches? How did teachers monitor their students? And what kind of interaction occurred between teachers and their students? This section attempts to answer these questions.

Instructional methods. That teachers must carefully structure technology integration and provide students with clear directions is no different than when teachers plan instruction not involving technology; however, the use of technology magnifies the importance of thorough planning and clear directions. Five teachers either referred to the importance of providing clear directions or were observed doing so. Linda said providing a lot of structure made it easier to ensure her students spoke in Spanish rather than English. She felt her students needed structure. "Even if you're an abstract-random type of learner, I think that that structure's still good for them." The printed directions she gave her students were thorough. They explained the activity, requirements, due dates, grading criteria and even which verbs to use. Donna said she provided similar directions:

> I always hand them a paper that says very specifically what they are supposed to be finding. I always give them web sites to start from. If it's a culture search, this is exactly what you're supposed to come up with.

For their German state presentations, for example, Donna reviewed the instructions in the classroom before taking her class to the computer lab. She gave each

student an instruction sheet containing the list of states from which he or she could choose, questions to be answered, suggested web sites for beginning the search, requirements for the PowerPoint presentation, and a detailed scoring rubric for evaluating the presentation. Two weeks later, just before students began their presentations, Donna referred to the instruction sheet she had given the students, reminding them about the requirements and what the students needed to learn from the presentations. As she introduced the French province project with a short video, she gave each student a small map and explained what information students should note as they watched. She told them, "I've given you some web sites for places to start. Here's the explanation of how you'll be graded. Here's the schedule for the next 1½ weeks. You can work with a partner, but you need to turn in individual projects."

Ellen gave her Spanish III students a worksheet, also available on her web site, that provided information and listed questions as well as web sites. She also gave her Spanish II students a page of helpful hints for making their PowerPoints attractive, readable and useful. Mary had modeled her expectations for the student-created "Japanese Class Show and Tell Topic Brainstorms" by having them first work on the Internet treasure hunt on cherry blossoms.

Extending learning experiences for students who finished their work early was handled in different ways. Rachel gave her students extra credit work, in one instance, a long list of questions regarding French culture. No directions were provided. Students were to answer as many questions as they could by searching the Internet. On the other hand, when Ellen's students finished their Spanish holiday presentations with 33 minutes

remaining in the period, she just handed out a worksheet and told them they should spend the rest of the time working on the worksheet and that they were to have a test in two days. Linda said students finishing early, "rarely happens because I know pretty much how long it's going to take. In that type of scenario I would have them redo some of the stuff. I'm monitoring them constantly."

Donna felt that limiting the amount of time in the lab was important. When her students use drill and practice software, Donna said she tries to limit their time in the lab to not more than 15 minutes; otherwise, the time is wasted. She gave students limited amounts of class time to work on projects, expecting them to complete their work during their free time at school or at home. Both Donna and Mary met their classes in the classroom to introduce projects before taking students to the computer lab.

Donna, Rachel and Ellen let their students pick topics from a list of possible topics. Linda allowed her students to pick any legend or any topic for the public service announcement presentations.

When their classes met in the computer lab, the teachers were available to assist with technology. Rachel helped students log in and explained information they found. Nancy assisted students as they wrote e-mails, attached their photos and then sent the e-mails to their German pen pals. Linda not only showed her Spanish III students how to use Inspiration, she also explained how to save their work. Donna showed her French students how to navigate through the web sites on the EuroQuest, how to use the special effects such as enlarging the bills, and said that copying and pasting answers into the

document containing the nuts and bolts questions was fine for this project since students were not creating original documents.

Before they returned to the computer lab to work on the EuroQuest for a second day, Donna met her French I students in the classroom and talked with them about the Internet searching they had begun the day before. She asked, "Are you finding it interesting? Is there anything you didn't find?" She explained more about the Euro. When a student said he was unable to answer one of the questions, Donna encouraged him, "Keep looking. We'll try to find the answers." She also told students that even though the EuroQuest contained five deep thought questions, they had to answer only three. Similarly, she met her French II students in the classroom and answered their questions. She told them, "We have a little less time today, so at least answer the first 22 questions. If you get to the deep thought questions, OK." She also told them that having so many web sites was both good and bad and suggested some students start with the web sites at the bottom of the list because on the previous day, so many students had looked at only those web sites at the top.

Other aspects of instruction were noted with individual teachers. Both Ellen and Linda arranged for students to take oral assessments one-on-one with the teacher while the rest of the class was working on something else. Ellen conducted these assessments outside the computer lab where her Spanish II students were using Blackboard to practice commands. Linda had organized her Spanish III students into two activity stations in her classroom. Students who were in the reading group sat, one at a time, at Linda's desk to read a paragraph from the book out loud. Linda reminded students to use their very best

pronunciation. As each student finished, Linda told him or her to choose the next activity. Some chose to listen to a tape cassette of Latin American music. Others chose to work with small, laminated pictures of Latin American art.

The teachers differed in how they accommodated for students who forgot their passwords. When Donna's and Rachel's classes worked in the computer labs, a few students forgot their passwords. Donna simply asked the technology support person to help the student log in. Rachel either helped the student or told the student to ask the technology support person for assistance. On the other hand, when two boys in Ellen's Spanish II class forgot their passwords for logging in to Blackboard for their commands quiz, Ellen told them they would have to come in after school to take the quiz. These boys then sat idle for 15 minutes while the rest of the class took the quiz. A few students had difficulty logging in and remembering their passwords but did so successfully with a little assistance from Ellen.

When teachers showed videos, they showed only short segments and stopped frequently to ask questions and have students write notes or information on worksheets. Linda, Donna and Ellen used this technique. To understand how this is accomplished, let us look at 36 minutes of Linda's Spanish III class watching video clips on Latin American music.

Linda handed out a worksheet and talked about video clips students would see. She asked students what "the arts" were and read scripts for the video clips. She asked students to read parts of the scripts. Then she directed them to write words on the worksheet while watching the clips. The first video featured a well-known Mexican

woman, Yuri, singing jazz. Linda asked questions about the first song which the students recognized as jazz. In the second clip a woman, Lucera, sang "pop." Linda reminded students to write answers on their worksheets. Then she fast-forwarded to the next song. She stopped the video and asked questions of the students. What words had they written? She asked about the instruments, talked about the next video and asked about *mariachi.* She read from the worksheet to introduce the next video, and then turned on video of a man, Pedro Fernandez, who sang three songs. Linda turned off video and asked questions about the songs. She asked students to get out their textbooks, telling them a picture of the next singer, Luis Miguel, was on a certain page in their book. She asked a question, told students to close their books, and then played another video of Luis Miguel and Yuri. She pointed to the singers in the video clips and fast-forwarded to other places in the video—including an interview with Luis Miguel. Finally, Linda stopped the video, asked questions and told students to write on their worksheets.

A similar description could also have been given for Donna when she showed a 9-minute segment of a video, *A Visit to France*, narrated in English. Donna paused the video several times, pronounced important names while students wrote on their worksheets, and explained about the Chunnel between England and France (especially since the video was produced shortly before the Chunnel was completed in 1994), how the Rhone River carried water from high in the Alps, and the French Revolution. Similarly, Ellen spent 20 minutes showing segments of a video (a textbook ancillary) on teen life in Mexico. She asked her students questions about the reading that accompanied

the video. She stopped the video after the first 7-minute episode and asked about the role of a chaperone. She asked questions following the second and third segments, as well.

The concept of playing only short segments of a video applies to audiotapes, too. During two of her observations, Mary used segments of audiotapes. A look at 10 minutes in one class describes how Mary used these tapes. She turned on a tape of a speaker pronouncing Japanese vocabulary words and asking students to "repeat." Mary and her class repeated each word in unison. Then the speaker (on the tape) gave a dialog in Japanese. He asked students to "repeat." Mary and the class repeated in unison.

Mary asked questions in Japanese and referred to the workbook. A girl responded in Japanese. Mary explained in English and turned on the tape again for vocabulary. The speaker pronounced vocabulary words one word at a time. Mary and her class repeated in unison. The speaker pronounced optional vocabulary words one word at a time. Mary told her students the words were not optional. She and the class repeated the words in unison. Frequently Mary asked individual students to respond.

Linda also incorporated short tape segments. In one Spanish IV class she played a tape that accompanied a textbook activity. Students read from their textbooks, listened to the tape and wrote whether the statements were true or false. Linda gave students time to reflect on their responses and then asked how many statements were true. This activity took all of six minutes.

The idea of using short segments of video and audio leads to the notion of students participating in a variety of activities on a same or related topic during any single class period. Five teachers mentioned this in their interviews. Variety of activities

was observed in the classes of three teachers. For example, Mary explained a story to her Japanese I students, handed out a paper containing the story about cherry blossoms, had students look at an illustration accompanying the story, played a tape of a popular Japanese song about cherry blossoms, asked questions about the song, and then had students write the song lyrics, translating from English to Japanese *hiragana* while they listened to the song again. For the last 30 minutes of the 90-minute period, Mary took her students to the computer lab where they performed an Internet treasure hunt—a word jumble about cherry blossoms.

Donna taught her students about *passé composé* and *imparfait* using a variety of activities including telling a story and having students snap their fingers for one tense and tap the table for the other as Donna talked, creating and then answering questions as they watched the mime a crimes, and reading *Cinderella* noting the verb tense. Another day when she reviewed the same verb tenses, Donna began by telling a story and asking questions. Her students responded and acted out parts of the story. Everyone spoke in French. Then Donna created an outline of the story on an overhead transparency while students told her what happened and in what order. As she wrote, Donna asked questions and students responded. Then she went through the outline and marked the correct verb tense as dictated by the students. These activities lasted for 16 minutes prior to Donna's taking the class to the computer lab to use French Lingo software to practice these verb tenses.

In one of her Spanish IV classes, Linda also used a variety of vocabulary activities. First, students paired off and stood in concentric circles. One student of each

pair had a laminated card with Spanish vocabulary words written on one side and the English translation on the other. Students on the outside were to translate the words into Spanish. Then the students on the inside looked at the English translation to verify the accuracy of what the students on the outside had said. Students moved clockwise and repeated the activity with new partners. Then Linda gave students new cards and the students went through the process again. Next Linda put a transparency on the overhead projector and students played the "Flyswatter Game" using the flyswatter to hit specific Spanish words on the wall while Linda pronounced them in English. Then students worked on an exercise in their textbooks and wrote the correct words, dealing with professions, on small, white masonite writing boards, and corrected each other's work. Linda then called on students to read questions, inserting the correct words. And, finally, students read sentences in their textbooks, listened to an audiotape and then wrote their responses on the masonite boards. All of this occurred in just 43 minutes.

Amount of Internet guidance. The amount of guidance given to students as they searched varied not only among teachers but also changed from class to class for some teachers. Three teachers indicated their students searched the Internet on their own without being given specific sites. Rachel said she encouraged her French students to find web sites on their own and, if they had questions about a site's validity, to ask her about it. Ellen said technology was a way for students to explore and she always gave them the opportunity to do so. When Mary's Japanese students worked on their Internet treasure hunts, she had not provided sites because she felt her students knew how to search. She told them to think about key words to enter into whatever browsers they

used. Mary said, "I knew they were already used to the format of the activity, so this time I made them start from scratch on their search and did not give them that information."

Four teachers said their classes had used guided Internet searches in which a teacher asks students to find information using selected sites only. Donna, however, was the only teacher whose students were actually observed working on guided searches. As her French I and II students worked on the EuroQuest, they were directed to 19 sites listed in their handout, "Europe Transitions to the Euro." In addition, the handout included 22 nuts and bolts short answer questions and 7 deep thought questions. Donna had obtained this EuroQuest from the Internet and tested each site prior to assigning the search to her students. Over time, Donna had assigned both guided and non-guided searches. After telling her students to explore on their own for information on Christmas in Germany, for example, she felt this method was a "big waste of time" and stated, "I think there's certainly a place for that kind of just open ended research, but you really have to have directed questions and give [the students] a place to go with it or you're going to get junk."

Three teachers either said they assigned, or were observed assigning, semi-guided searches in which a teacher provides at least one web site and then allows students to explore further. For their first Parisian monument search, Rachel gave her students one web site with which to begin and then expected them to use browsers. When students began their second Parisian monument project, Rachel's printed instructions included four web sites; however, students could search elsewhere. She provided three web sites

students could use to begin their research on French *châteaux*. In her preliminary interview, Mary said she also did this for her Internet treasure hunt; however, when her students actually worked on it, she did not give them any sites. Donna had given her students suggested web sites for their research on German states. She had checked these sites to make sure they worked and told her students she expected them to search other sites as well. Although she had tried different methods, she said, "I give them places to start in case they're a little bit of a novice or don't know what to do....And then I give them specific things I want them to find out about the places." Later she said, "When I first started having students do Internet searches, I gave students specific sites, then just let students search any sites [and] now have semi-directed searches, a happy medium—a place to start."

Linda said she had used several methods, from guided to non-guided. Previously when students were not as familiar with Internet searching, she previewed sites and gave more direction. Donna said some students need more direction than others. She had assigned a variety of searches and said directed searches can be problematic because URLs change, requiring teachers to find other sites.

Monitoring students. All six teachers monitored their students as they worked in computer labs. Monitoring consisted of both general oversight of students and providing technical assistance. Teachers walked around the labs, looking over students' shoulders, noticing what was on computer monitors, asking and answering questions both about technical processes and about information, and making sure students were properly engaged in the learning activity. It was not uncommon to hear Rachel ask, "Do you have

something to work on?" or for the lab supervisor and Nancy to discuss the progress Nancy's students had or had not made.

When Donna's students worked in the lab on their German state presentations, she told them when they found information they should save it to their server accounts rather than just printing pages from the Internet. As her students worked, Donna walked around watching what students were doing and helping them. She even suggested going to different web sites. She reminded students about the amount of time remaining and the schedule for when they would work in the lab. She offered suggestions while students worked, sometimes responding to questions by not just giving the answers but enabling students to search more to find the answer. One student told Donna, "Everything I come up with is, like, not school appropriate." Donna responded, "Well, then, let's get out of it." When a student found a "neat" map, Donna asked if he had saved it. To help everyone, she wrote the map URL on the board.

When her French III students used Lingo to practice verb tense, Donna walked around, helping and encouraging students. Every once in a while she would say, "Good." She told a student, "OK, go back and put in your accent or the computer's going to count it wrong." To another student she explained how to write a certain verb. She walked over to a different student and asked how to write a similar expression. Similarly, when her French I students used Lingo, she not only helped them get to the right lessons but asked students if they had worked on *avoir* and *etre* verbs since most students were still working *er* verbs.

Linda taught her Spanish III students how to use Inspiration, but she let the audiovisual-technology specialist teach iMovie. Even though this person taught iMovie, Linda was very knowledgeable about it and assisted students as they worked. Throughout the time her classes were in the lab, Linda was very much in control. She provided explicit printed instructions, reminded students about how to save their work and exit properly, suggested different web sites, assisted with software questions and helped students think through problems. Most of this time she spoke in Spanish.

Likewise, Ellen and Mary monitored their students as they worked in the lab. Both walked around, watched what students were doing, talked with students and answered questions about information the students found.

Discipline did not appear to be a problem for any of these teachers. Some of Rachel's, Ellen's and Nancy's students finished their work much sooner than these teachers expected, so that they had to ask, "Do you have something to work on?" or admit, "I must have made that assignment too short." Students sometimes became sidetracked, looked at their e-mail, explored non-class related Internet sites and played Internet games. This generally occurred if students thought they had finished their work and the teacher was not closely monitoring student activity.

On some occasions Rachel didn't monitor closely or in a timely fashion. For instance, a French I student spent an entire period working on the background for eight slides but had not entered any text. Rachel did not notice this until nearly the end of the period and then told the boy he should work on text first.

Ellen felt disappointed in the quality of her students' PowerPoints. She had not checked on the students' progress or seen their presentations prior to when they were given in class.

Most of the time when Nancy's German I students were in the foreign language computer lab working on their weekly assignments, Nancy was teaching in her classroom. All first year foreign language students in her school were required to spend one period (of non-class time) each week in the lab staffed by a full-time supervisor. This person was technically knowledgeable, interacted with students and discussed assignment expectations with Nancy ahead of time.

Three schools had labs staffed by technology and/or supervisory personnel who collaborated with teachers and/or assisted both students and teachers when classes were in the labs. Nancy's school had a full-time supervisor in the foreign language computer lab. In addition, a technology person assisted students in attaching photos to their e-mails. When Linda was in her library's computer lab, an audiovisual-technology person not only assisted students but also taught them how to use iMovie. This person and Linda collaborated on this project ahead of time. The person also visited Linda's class to observe the final presentations. In addition, this lab had a full-time supervisor. Whenever Donna took her classes to the computer lab, a technology person was available for assistance.

Interaction between teacher and students. While students worked with technology, teachers interacted with individual students and/or small groups. This was true of Nancy, Donna and Ellen. Five teachers assisted students one-on-one. In addition,

five teachers also orally instructed or directed their classes. Nancy said she felt more like a facilitator than a teacher. "I'll just direct what I think they should do and then they can be as creative as they want to....I don't have to stand there and tell them every step of the way what they have to do." During one of Rachel's observations and one of Ellen's, Rachel and Ellen interacted with students very little. Rachel walked around a lot but seldom talked with her students. Ellen sat at a table near the computers and occasionally walked over to the students answering their questions. Rachel, Donna and Ellen all interacted with students during and after their PowerPoint presentations.

Evidence of teacher planning. The way in which they worked with students during the observed activities was evidence of advance planning on the part of most of these teachers. Linda and Donna provided detailed instructions and grading criteria. Linda and her audiovisual-technical person discussed the activity on which they had collaborated, talked about processes they planned to use, made sure appropriate software had been loaded on the lab computers, and brought a cart full of legends books into the lab. When Linda and Mary used audiotape segments, they knew exactly where to start and stop the tapes. The same was true when Linda and Ellen showed video clips.

During one class period, however, Ellen hadn't planned enough. Her Spanish III students finished their Internet research on the Mayas 15 minutes before the end of the period. For the rest of the period students just sat and talked, not in Spanish, or did other computer things (personal e-mail, games) of which Ellen did not approve. Even though she said this class was advanced and always finished early, she had not planned additional activities for them.

Although she had not created the EuroQuest herself, Donna had checked each web site listed to make sure it worked and also to understand the type of information each contained. When Linda planned for her students to work on activities at three different learning stations, she brought three mobile computers into her classroom for one of the stations. As she tested computers, she discovered the wireless network was not working. She had a back-up plan. In class she gave students packets of laminated art picture cards with information and questions about them. She also had to adjust how she grouped students.

In one instance, the teacher appeared to plan just in time. Rachel had been ill for three days but e-mailed me on a Sunday saying when she arrived at school the next morning she would try to schedule all of her French I and II classes in the computer lab for every day that week. She was able to do so.

Sometimes planning was not evident. When her French II students worked in the lab on their *châteaux* PowerPoints, Rachel handed out the assignment and let students work for three days with little guidance. She didn't seem to monitor their progress. At no time when her students worked in the computer lab did Rachel establish checkpoints or suggest daily goals. Rachel's French I and II students spent a great deal of time (as many as 10 days within a 5-week time period) in the computer lab. In addition, during the same time period all sections of both classes had spent three class periods watching a video about Napoleon because Rachel had been ill. The French I students spent 4 days (3 researching and creating, and another presenting) on their first Parisian monument PowerPoints and then another 4 days creating and presenting a second Parisian

monument virtual brochure (PowerPoint). The same students had also spent two days creating PowerPoints depicting conversations between a customer and a server in a restaurant. Rachel's French II students spent 4 days on the *C'est pas mon jour* PowerPoints and another 4 days doing Internet research, creating and presenting PowerPoints on the *châteaux* of the Loire Valley.

Evidence of flexibility. Teachers talked about needing to be flexible because technology did not always work as planned. As Linda stated, using technology, "makes it more pronounced because if you have your whole lesson plan designed around that piece of technology and it doesn't work, you can't just give [the students] a study hall....I think that's inappropriate." Similarly, Ellen said, "It's like anything you do in class. Your overhead light bulb could blow out in the middle of your notes. You have to think on your feet and be prepared, always for that unexpected no matter how you're teaching."

During two of Linda's observations, the technology she planned to use did not work. She was able to adapt because she had planned and tested equipment ahead of time. When the three wireless computers did not work, she had back-up materials for that activity station. When the audio portion of the public service announcements could not be heard on the videocassettes in the VCR, she contacted the audiovisual-technology person who connected the digital camera directly to the VCR in order for the sound to be audible. Linda's actions aligned with her comment, "If you're planning to do some technology things, you just kind of have to have a back-up plan just in case something doesn't work. Have some options."

Donna changed her plan to have her French students use the online Quia software because when too many students used it, it locked up. She said it worked much better with smaller classes. Therefore, she had her students work with Lingo instead. And when she noticed that two bright students had finished their Lingo practice in a very short time, she suggested they use Quia to play an online word-matching game.

Donna provided additional activities for students who finished their work in less time than expected. On the other hand, because some students in the same class took longer, she allowed the class to work in the lab for the entire period. She had not planned to stay that long but said doing so seemed appropriate since students were learning. Another instance showed how she adapted for a student who was having difficulty absorbing information in the French province video. Donna simply said, "We'll rewind. The video is short."

Mary and Ellen both had classes in which not all planned activities were completed. Mary simply told her Japanese students she had not been able to explain about colors and prefectures using the overhead and would do so the next class period. When Ellen's Spanish III groups gave PowerPoint presentations on their trips to Spain, they took longer than anticipated. Students had also brought food, made from recipes found on the Internet and representing the cities they researched, to share with the entire class. After a few presentations, Ellen announced that not enough time remained to give the rest of the presentations and to eat the food. Students chose to eat the food that day and give the remaining presentations the next day.

This long section has described how these teachers' students used technology, how they behaved when using technology, the quality of their work, the amount of time spent using technology inside and outside class, and how students were held accountable for their work. In addition, the teacher's role was explained. What instructional methods did the teachers use? How much guidance did they provide when their students did Internet research? How did they monitor and interact with students? What evidence was seen of planning and flexibility?

Teachers' Reflections on Activities

Although the previous section described technology-integrated activities at great length, it did not reveal how teachers felt about these activities. During wrap-up interviews, each teacher was asked to reflect on the observed activities, explain how they felt about them and describe anything they might change in the future.

How teachers felt about activities. When asked how they felt about the observed activities, all six teachers said they felt good or fairly good about these activities. Rachel said, "I had a pretty good feeling except for technical difficulties that one day when we were presenting....I think they worked pretty well in the lab." Linda, commenting on using iMovie as a tool rather than an end product, said, "So even though it didn't go as well as I had anticipated, it did what it was supposed to do." Donna felt she had planned the Internet research on German states "well enough this time that it wouldn't go crazy. Because that sometimes happens. They get too long and involved. I had one that was a 30-minute presentation" because the student had found so many interesting things he wanted to talk about. "And, so, that's great, but it was a little too much."

Although the teachers said they were satisfied, three thought there was room for improvement. Linda felt her students could have managed their time better. She was disappointed in those students who had not videotaped prior to working with iMovie. She felt her students focused so much on creating the public service announcement videos that they did not spend enough time on their oral presentations. "The content is lacking because [the students] want [the video] to be visually appealing." Donna wondered what to do for students who really did not care and just guessed when they use the Lingo software program; however, she said that would have been a problem with or without technology. She sometimes became frustrated with the German state presentations because they took so long and because students did not always find the important information. Mary said she was fairly pleased, "but I still feel like I have a long ways to go on the spectrum of being proficient in technology."

Ellen was embarrassed by the quality of the Spanish II holiday presentations and said those students weren't as motivated as were her Spanish III students. Ellen expressed her disappointment:

> In previous years I have received a lot better quality types of PowerPoint presentations with more and accurate information. A lot of [these students'] information was inaccurate, and they didn't check that out, or they just found the first thing and put it up there. I really noticed that decline in their motivation and their wanting to do well in class.

She continued:

> After I had given my Spanish II the assignment and after I had seen their

> final projects, I'm almost to the point where I don't want to do it anymore. Not because I don't think it's beneficial, but because what they're doing is not making it beneficial. They're not getting accurate information.

What teachers would change. After her last observation, each teacher was asked what she would change regarding the observed activities or the integration of technology. Each responded differently.

Nancy said there was nothing she would change at the current time; however, at the end of one observation she said, "Some assignments are more effective than others and as I teach the course again, I will try to improve the ones I feel weren't as effective."

Rachel said she would reduce the number of required slides because of technical problems and because she wanted all students to be able to present in not more than two periods. Likewise, Donna was concerned about time and said she might have to limit the length of the German state presentations in the future. Linda said she would have her students spend more time learning to use iMovie but would emphasize that the student-created videos were just the visual aid and not the presentations themselves. Although she had explained this in her instructions, students did not work as much on their oral presentations as they did on their videos.

Donna said she would have had maintained more control over the German state presentations had she required students to turn in rough drafts and outlines ahead of time. She had done that in another class but not this time. In retrospect, she thought she should have required that this time. Although she felt mostly good about what her students did, Donna said:

> I always end up saying, "I need to do it differently." I know it's a good experience. I know it's a good thing to do, but something's not quite right. And then I tweak it. I'm not sure how to fix that, but I think it's a good experience. I like them to do the research. I like that idea, but I'm still not happy with how I get them to present it to me.

While expressing her disappointment in the Spanish holiday presentations, Ellen also talked about needing to change:

> I'll probably have to think of, maybe, how I can modify this differently if I want to make these students responsible for teaching the class about the holidays. Or do I want to do an activity where they're responsible for learning about them on their own?

Both Ellen and Donna said they would be more specific in explaining project requirements, both technical and informational. In addition, Ellen said she would talk with her students about the importance of validating sources:

> Most students don't even look up the book or the encyclopedia. They just go straight to the Internet because it's quicker for them. But I think they do need to learn which sites are valid or respectable so they know that they're getting accurate information.

Mary mentioned that although her students were observed doing non-directed Internet searches, she had previously given them activities that included directed searches. She said in the future, from the very beginning, she would not have students

conduct directed searches. She would let her students search without giving them specific sites to use.

So far, this chapter has described how participants and their students used technology. Technology use by teachers for both management and instruction was explained. The discussion then focused on how students used technology. An illustrative scenario was provided for a technology-integrated activity for each teacher. These scenarios were followed by detailed descriptions of a variety of activities, as well as explanations of related topics such as student behavior, accountability and the teacher's role when students use technology. The chapter continued by revealing teachers' reflections on the activities—how teachers felt about the activities and what things they might change. This chapter now turns its focus from *how* the teachers used technology to *why* they did so.

Why Teachers Use Technology

The chapter continues with explanations of why these teachers use technology: their beliefs about technology's role in instruction in general and, more specifically, in foreign language instruction; factors that contribute to or inhibit the teachers' use of technology; and the teachers' backgrounds and training.

Beliefs. When asked what they believed about the use of technology in instruction, teachers responded with statements reflecting their thoughts about the larger role of technology in instruction as well as what they perceived as the relationship of technology to foreign language instruction, per se.

General beliefs about the use of technology in instruction. The responses about the use of technology, regardless of whether or not it was in foreign language instruction, seemed to fall into six categories:

- Purposeful use
- Motivation
- Variety of instructional strategies
- Student performance
- Technology as a life skill
- Teacher convenience.

The first five categories could be described as student-centered, while the sixth was teacher-centered.

Purposeful use. All of the teachers except Rachel and Linda spoke of technology as an instructional tool or referred to purposeful use of technology. These expressions seem very similar. Repeatedly throughout her initial interview, Nancy stressed she viewed technology as a tool, not an end to itself:

> I think it's a good tool. There are so many things you can do with it, but I don't think it's an end to itself. I don't think we have to get all our information across through technology, but it definitely enhances what we already have here.

And later Nancy said, "I don't build everything around technology. I just kind of pull it in as I need it." Ellen stated, "I really don't think it makes that big a difference, technology in general. I think of it more as just a different delivery mode."

Mary's thoughts were similar. "I don't think that the technology is the answer in and of itself. I think it's the medium by which you can open up your classroom." In fact, she mentioned some use of technology might actually inhibit learning. She said she did not have Japanese word processing software. Even if she did, it would not be appropriate for first year students because they need to learn to write Japanese characters by hand. "If they're typing it, they won't learn it. They need to learn in writing. Learning the writing teaches you a lot about Japanese culture in general."

Donna made several comments stressing purposeful use of technology. "If [technology] seems to be useful and helpful, because it has so much potential, I will stick with it....I've evolved. And I probably have reduced my use of technology to just the things I find useful." She continued:

> I've gone in peaks and valleys of my use of technology from thinking everything had to have technology attached to it, to now I've realized you can do this and enjoy the technology and not go overboard with it. Everything isn't appropriate. Is it a good use of your time?

Nancy, too, had seen a broad range of technology use among teachers and warned of losing focus:

> I have seen some teachers get so into [technology] that I think they have almost lost track of what the focus of their curriculum was, but I think if we focus first on our curriculum and then see. How can we facilitate this curriculum in a variety of ways to teach different types of learners?

Motivation. All teachers viewed technology as motivating students or helping to keep them engaged in the learning process. Rachel said animation in PowerPoint "keeps students' attention longer." Mary also referred to animation but from a different perspective. "Video and animation are the main reason half the Japanese students are taking Japanese." Linda said her students were excited to use computers and that they keep it "more interesting for the kids and myself. There's always something changing and something new in the technology. That keeps it fresh, too."

Throughout her initial interview Donna referred to the motivation provided by technology.

> When I made this little project for *The Little Prince*, I did it intentionally to motivate [the students] because I knew they'd enjoy it....The project could have been done just as easily with poster board and a piece of paper, but the motivation part of it was the hook. I think there are times when I use it as straight motivation because they need a change of pace.

Later Donna said, "They think this is fun. And sometimes they say it even helps them understand...which is really the goal." Another way in which she felt technology motivated students was when they realized their PowerPoint presentations would be shown on a large screen to the entire class, they made more effort to be organized, use correct spelling and create attractive and informative slides.

Ellen also said she used technology as a means to interest students in what they were learning. She added, however, that she did not think technology made a "huge difference in what they're learning or how they're learning. It's just another way to help

them get excited about the language." Nancy's opinion differed. She saw a relationship, but not necessarily causality, between technology and motivation. Nancy said:

> The motivated student really gets into technology because it lets them go and do a lot of creative things. For the student who doesn't like the subject matter or isn't very motivated to learn, I've notice that, I'm not sure technology makes a great deal of difference. If they're not motivated to learn the language, they're not really motivated through technology to do any better.

Linda made several references to her perception that technology helped engage students. When she first began using technology, the purpose was to engage students. They would "do things on computer that they wouldn't do on paper." These computer activities included playing computer games such as Concentration and creating electronic storybooks instead of making them out of construction paper. In addition, she said WebQuests also engage students and "trick them into learning how to evaluate web sites, how to search, how to investigate, what kinds of things can you do with the information once you have it?" Linda felt strongly that, because students were used to watching television and videos and playing video games, "some of the newer technology can kind of keep their interest, or they're more accustomed to doing things very quickly and having instant results."

Donna's perspective was that, although students thought technology was fun, exciting and different, it was no longer new. She thought integrating technology into the learning process gave students "a reason to not just dink around on the computer but to

maybe find something that is actual and real and that they'd be interested in." When she created activities in which students had to use the Internet, they would surprise themselves by enjoying the research and finding interesting information. She echoed Ellen's sentiments about technology's not necessarily helping students learn the language better but said, "I think it probably keeps them from getting bored. It gives them a reason to try harder."

Ellen said her students enjoyed PowerPoints because they were different. She often presented grammar and vocabulary notes via PowerPoint rather than using an overhead or writing on the board and felt her students paid more attention when they took notes from her PowerPoints. They laughed at her funny sound effects and stayed more alert. "It's easier for me to get my information across on a PowerPoint than having to flip through overhead and through overhead" because she could just click and make the answer appear rather than having to layer overheads or write out answers. Ellen also mentioned using CD-ROMs with first year Spanish students helped to gain their interest because the CD-ROMs are different, students can listen to voices other than the teacher's and they can work individually. She said most of her students enjoyed technology and it was "another avenue to use to help gain student interest."

Variety of instructional strategies. All teachers said technology makes possible a variety of instructional strategies that engage students by taking into account their learning styles, readiness and interests. Technology helped teachers utilize a variety of instructional strategies. The teachers not only talked about variety but were also observed integrating several instructional activities within a single class period. In her

initial interview, Linda commented on the importance of variety. She felt technology was "one of the easiest ways to add variety." Later Linda said students expect to be entertained and are used to a variety of entertaining, fast-paced activities:

> We don't ever do anything for an extended period of time if I can help it... so that they don't lose interest and I can keep them on task....If we do anything for too long of a time, if they start not getting it, if they start not understanding, then I lose them. And they won't re-engage themselves. But if we change activities more frequently, they're more likely to go ahead and try to engage themselves....

Variety in activities is important because different activities address different learning styles. Using technology to accommodate for different learning styles was mentioned by several teachers. Both Mary and Rachel thought using computers appealed to tactile learners and helped visual learners. Nancy also commented on delivering curriculum for different types of learners. She felt audiotapes and CDs helped auditory learners while visual learners could see things on the Internet. In addition, technology provided variety in pace. "Whether they learn it in the first day or they learn it the tenth day, there's some way they're going to learn it because we cover so many different ways of learning." Both Linda and Ellen said they try to address learning styles, giving students options each day or with different projects.

In addition, teachers said technology helped individualize the pace of learning. Donna, Ellen, Rachel and Nancy felt when learning was facilitated by technology, students who learned more rapidly could move on to additional activities without having

to wait for other students to finish. Likewise, students who learned at a slower pace or who had difficulty learning could repeat activities without slowing down other students. One example of accommodating faster learners was when two of Donna's bright students finished their Lingo grammar activities in very little time, and she encouraged them to explore additional activities on Quia while the other students finished with Lingo.

Along the same line, both Rachel and Linda said technology allows students to be more creative. Linda felt students could be more creative with technology than by simply creating a poster. Rachel said, "They can design it however they want. They can put sounds to it. They can be as creative or uncreative as they desire. So it really gives the students a way to express themselves."

Student performance. The teachers commented on technology's relation to student performance in general, whether or not it helped in language acquisition and the quality of student work when technology was used.

When first asked why they used technology, Rachel, Linda, Donna and Nancy each referred to improved student performance. Rachel felt her students' writing improved because they could see their sentences on the computer monitor and she could provide immediate feedback. She also felt her students were more accurate with accents, for instance, and that this accuracy was evident not only in the students' PowerPoints but also transferred to hand-written assignments and tests. Linda mentioned the benefits of spell checkers and word processing even for special education students in her Spanish classes. When foreign language teachers in Nancy's building discussed student achievement and whether or not to retain required weekly lab assignments for first year

language students, they agreed to retain the assignments because "it was a good reinforcement of taught materials and gives students more time to work though material."

Teachers had mixed opinions about whether or not technology affected language acquisition. Ellen did not think technology affects acquisition. It is "just another way to help them get excited about the language." Linda did not answer the question directly but said technology reinforced instruction and learning. Nancy felt technology made using the language seem more real. Donna was uncertain but said using technology helps her students learn grammar concepts better.

Rachel, Linda and Ellen felt the quality of student work was better when technology was incorporated into the learning process. Not only does technology allow students to revise their work more easily, but, because projects such as PowerPoints are displayed for others to see, students take more care in creating them. For example, Linda said, "The quality of story books was better when created on computer than those on construction paper....Knowing the class was going to see [the student's] product at the end also makes a difference."

Technology as life skill. Although mentioned by only one teacher, this reason for using technology should be acknowledged. At several points in her initial interview, Linda said she integrated technology because students would need to use it in their adult lives. She said she gives them opportunities to practice using technology in different ways and that doing so helps students learn to manage time, become risk takers and be exposed to a variety of programs. She considered the ability to use technology a life skill.

Teacher convenience. Teacher convenience could summarize comments made by four teachers. Both Rachel and Ellen said they used PowerPoints to present information because doing so was easier for them. They could create, use, revise and reuse PowerPoints and navigate through them more easily than they could with stacks of overhead transparencies. In addition, because Ellen had inserted her pre-recorded voice into her slides, she was less likely to lose her voice before the end of the day.

Donna admitted technology provided a much-needed change. She said because so many students at her school want to take Spanish, she needed a gimmick to attract students to French and German classes. Rachel also felt integrating technology might be a way to entice students into taking French, thus maintaining enrollment and ensuring the availability of French courses at her school.

Beliefs specific to foreign language instruction. So far we've examined teachers' beliefs about the role of technology in instruction in general, regardless of the subject. Next we will focus specifically on reasons teachers gave for using technology in foreign language instruction.

Communication in target language. Teachers stated technology, whether audiotapes, CDs, videotapes, or the Internet, provides improved ways for students to communicate with native speakers and writers in their target language. Both Nancy and Linda mentioned technology allows students to hear native voices, not just the teacher's voice. Nancy said when her students work on dialogue, technology enables them to "take the same vocabulary and use it in different ways. If a new situation comes up, they have to think on their own. Where before, everything was more memorized." Linda felt

technology makes it easier for students to hear accents and provides much needed repetition. Mary warned although technology is helpful and very important, especially in giving her students the opportunity to hear native Japanese speakers, "it doesn't take the place of conversation or relationships with people." Although she did not have her students e-mailing people in Japan, she felt technology could make communication possible in this way.

Authentic resources. The most frequently mentioned reason was that technology, specifically the Internet, provides access to unlimited authentic resources. Rachel said information available on the Internet is more comprehensive than brochures she obtained when she was in France and had used with her students. Nancy listed some authentic resources and types of web sites her students use: German schools, movies, restaurants, newspapers, radio stations, train schedules and book stores. She said these were especially helpful for advanced German students. "The realness of the situation is the biggest thing." With technology, students can visualize a situation; whereas, before students simply memorized dialogues. Nancy said that approach, "never seemed real to the students." She continued by saying technology "makes it more real and the kids get into it more. It's almost like a virtual situation where they might, in their minds, think that they're really in the country using it."

Linda said her Spanish students could access a wide variety of authentic resources they would be unable to use without the Internet. She specifically mentioned two types of resources, the first being Spanish language newspapers from Peru, Mexico, the Dominican Republic and Argentina that are all currently published on the Internet. She

also said through WebQuests such as the AmazonQuest, "students have access to experts that they wouldn't" otherwise have in their local community or state.

Donna also listed resources available via the Internet: clothing catalogs, travel information, Metro maps, hotel costs, information about monuments and other tourist attractions, French newspapers, apartment ads and train schedules. She talked about the unlimited variety of authentic resources, how readily accessible they are, and that this kind of information is just not available in traditional resources. She compared times when she collected stacks of Metro maps for her students to use with how students now can go online and instantaneously see Paris maps on the computer monitor. She also described how her students use these maps. They "position themselves at one monument and figure out how to get to another monument. Students can figure out exactly how to get from one place to another using the Internet." She stressed having this access to authentic resources "is just a phenomenal advantage that I never had when I first started teaching. It gives the kids hands-on, real-life access to the culture they're studying. That is a wonderful thing."

This attitude was expressed by Mary, also. She said, "Students can access information and materials they just couldn't have access to without the Internet." She continued, "If I don't use it, if I don't better myself in that area, then my students will not get the best education they need." Mary incorporated a lot of videos into her classroom, videos she had taken when she visited Japan, because she wanted her students to hear native speakers and see real Japanese high school and middle school students.

Current resources. One aspect of authentic resources mentioned by four teachers was that the Internet allows students to access current information. Nancy pointed out that her German textbook was eight years old and would most likely be used another three years. Therefore, being able to supplement with current information, such as the Euro and life in Germany after the demolition of the Berlin Wall, was extremely important. She also mentioned German train schedules, newspapers and radio stations as examples of current resources available via the Internet. Linda mentioned accessing Spanish language newspapers.

Donna said that its being timely was another "beauty of the Internet." She continued, "In foreign language, you can get up-to-the minute what is going on in that country." She described how, during the 2002 Olympics, many foreign language teachers shared lessons via listservs and bulletin boards, lessons that included Olympic stories and vocabulary. In the same manner, shortly after the Euro became the standard currency of the European Union, she found a EuroQuest on the Internet and had her students do the activities to find the latest information on the Euro. This would not have been possible with traditional resources. Another example of up-to-the minute resources was the French rail system train schedules. Even if teachers had obtained paper copies while visiting France, the schedules most likely would have been out-of-date by the time students used them. Not with the Internet. The schedules are available in real time.

Donna also talked about how traditional resources such as textbooks and videos become dated. She said, "Now you never have to talk about things in an out-of-date way. You never have to give them old information." Mary added that downloading Japanese

newspapers from the Internet, even when they are written in English, is a "way to stay abreast of current events."

Even though Ellen and Rachel did not specifically mention how the Internet provides access to current information, their students were accessing current information for their projects: Rachel's students researching Parisian monuments and *châteaux*, including the hours they were open to visitors, and Ellen's students planning trips to Spanish cities.

Culture. Developing an understanding of the culture of the target language is one of the five goals of foreign language instruction. The teachers reflected this not only in what they said but also in what was observed. Rachel said her students had watched videos to compare French commercials with American commercials. She talked about having her students find information about Parisian monuments. Not only were students observed doing this, but they were also observed finding information on French *châteaux*.

Linda explained why she used videos with her Spanish students. "It's good for them to be able to see the places that we're talking about other than just in pictures." Because she wanted her students to think about cultural issues from a native's point of view, she utilized AmazonQuest. Students had to research problems associated with the rain forest as perceived by different types of Peruvian people. She said, "The more they can learn about the peoples, we'll be a better world for that."

Donna explained that all foreign language students, no matter what level, in her school are required to work on one independent culture project each semester. These projects enable students to explore cultural topics that could not be covered adequately in

class: German music, French fashion and French horse racing, for instance. Many of her students do their research using the Internet at home. Donna said, "The Internet has made it really possible to do those things. And to hopefully draw out their interests and let them use what they like and know to learn more about another culture." Another advantage of the Internet was that it gives students an insight into aspects of French culture for which they have no equivalent experience. For instance, French people utilize the French rail system. Students living in the American Midwest would seldom have experienced riding on a train or a metropolitan transit system unless they visited a large city.

Mary said the main thing all foreign language teachers want to do is "to open the world up their kids, their students, and bring the world to the classroom. That's always how I've then viewed it, and without technology it's just a lot harder to do." Mary utilized video and the Internet to help students "get past the few stereotypes they have. I think to see it is to believe it." She does a lot of role-playing with her students, but it is not adequate to gain an understanding of Japanese people and culture. "It's better if they actually see it and vicariously experience it. And I think that's what technology could...give them a chance to do more than anything else."

One of the reasons Nancy encouraged her German III students to exchange e-mails with pen pals in Germany was for students in both countries to develop a better understanding of life in the other country. For instance, when American students read in their textbooks something they did not understand about German teenagers or life in

German schools, they e-mailed their questions to their pen pals. The students in Germany had similar questions for Nancy's students.

The teachers' beliefs about the use of technology in instruction have been described. They talked about the larger role of technology in instruction as well as what they perceived as the unique role of technology in foreign language instruction.

Other factors affecting use of technology. Why teachers use technology was not related just to their beliefs about technology, but perhaps more importantly to what they perceived as contributing and inhibiting factors. In fact, these responses were quite numerous. Not only did teachers describe these factors in their interviews; in addition, some factors they mentioned were also evident in observations.

Contributing factors. When asked about factors that contribute to their use of technology in instruction, teachers provided a variety of responses clustered into the following broad themes:

- Student familiarity with technology
- Abundance of Internet resources
- Improved and/or user-friendly technology
- Building and/or district support
- Technology personnel
- In-service staff development
- Access to technology
- Personal acquaintance with teacher in other country (to obtain e-mail pen pals for students).

Student familiarity with technology. Teachers unanimously commended their students for their knowledge of technology. Students either already know how to use technology or they are quick learners. Nancy commented:

> Kids now are so well knowledged [sic] in technology themselves....It's still to the point where the kids know more about technology than the teacher.... The positive side of that is the fact that you can direct something to the kids and they just go and do it. They just know how to technically make their product look good.

Ellen, Linda and Mary echoed that statement. Ellen said, "More kids know how to do the basics than ever before. And now I just assume that everyone knows...and if they don't, the person next to them knows how to do something or they can figure it out." Linda said although none of her students had used iMovie before learning it in her class, they would all "be the experts by the time we're done." As far as specific technologies were concerned, three teachers said their students knew how to use PowerPoint, three commented on how Internet savvy their students were, and one cited students' word processing skills.

Five teachers talked about how students helped each other and/or the teacher. For example, Mary said if a student doesn't know how to use PowerPoint, she pairs that student with one who does and "they end up helping each other more than I ever have to help them." Donna was amazed by what her students can do with technology. They help her locate Internet images for PowerPoint presentations, recommend Internet sites, edit

videos, make tapes and even set up the presentation room. Similarly, Nancy described how she relies on students:

> I'm not afraid to ask a student, if I don't know how to work something....It makes for a good relationship with the teacher and the students when you kind of work together and you even say to your student, "I don't know how to do this. Could you help me?"

As far as specific steps their schools had taken to facilitate student use of technology, both Rachel and Ellen said all students in their schools have student accounts on the building server. Students in four schools enter high school already having taken technology classes, take a required technology class in high school or are trained in using technology within predetermined high school courses. For instance, in Donna's school, all ninth graders learn PowerPoint in their required history class and Word in their required English class. Donna, Linda and Mary all stated that, because students acquire these technology skills in other classes, they (Donna, Linda and Mary) seldom need to teach these skills and, thus, are able to focus on instruction and learning—and the integration of technology with both.

Abundance of Internet resources. Mary, Ellen and, especially, Donna talked about the abundance of Internet resources that were often available at no cost. Mary said her students could "access information and materials they just couldn't have access to without the Internet." This was very important for Japanese students because traditional vendors' catalogs either do not include, or include very few, Japanese resources. Donna was enthusiastic when she described a variety of Internet activities developed by other

foreign language teachers and shared via listservs and teacher and organization web sites. She excitedly said:

> You could spend every minute of every day in the computer room doing those things if you wanted because people all over the United States have created some excellent things, put them on the Internet to share....There's no cost involved.

Improved and/or user-friendly technology. Technology itself could be a contributor or an inhibitor. Technology problems occurred when Ellen's and Rachel's students worked in the computer lab. The wireless network did not reach the computers in Linda's room. These problems could discourage teachers from using technology; however, Rachel said these problems were not serious nor did they occur frequently. Linda understood why the wireless network did not work and adapted her teaching strategies. She possessed a sound understanding of technology and its associated problems and was able to provide solutions in spite of the problems.

Rachel, Nancy and Ellen all described some technologies they used as being user-friendly. Nancy said although Blackboard could be somewhat complicated, she had easily learned how to use its features. She liked using her wireless laptop computer because she could carry it from her office to her classroom and use it there with very little effort. Although she said she could do this, she had not yet done so. Ellen's comments about Quia activities were similar to Nancy's sentiments about Internet activities. Ellen said:

> It's like a template....You put in your own vocabulary. You put in your own questions. And they have all the programming stuff....You don't have to know all the programming to make the flash cards turn over, and things like that.

Building and/or district support. All of the teachers except Rachel talked about contributing factors that fall under the broad heading of support provided by building and/or district personnel. Linda described how, during the most recent foreign language curriculum development and adoption process, the district curriculum specialist provided 10 wireless computers, each on a cart, for each high school's foreign language department. The curriculum specialist wants teachers to use these computers (in essence, a type of portable mini-lab) in instruction. Linda said this of this person:

> [She] has done a lot with trying to get us involved. And, so, that's kind of where I come in, in giving the presentations with what I've done with the interactive expeditions. And I learned Inspiration because she said, "Hey, do you know anything about it?" and said, "Great. Give a presentation on it."

Linda said these kinds of encouragement and support create a positive climate for using technology.

Donna and Ellen cited the support of their building principals. When technology was still rather new in education, Donna's principal purchased TRS80 computers for Donna's school and encouraged her to use these computers. Ellen talked about how her principal had been supportive when Ellen wanted to participate in technology training.

Three teachers referred to the support and encouragement provided by the building library media specialist. In Ellen's case the library media specialist invited her to participate in technology training offered outside the district. Linda's library media specialist had asked Linda to be a technology teacher/leader for the district. And Mary, referring to the changing role of library media specialists and how "they're having to be more and more handy with technology," said, "I'm finding that my media specialist is a huge resource for me. And I think that she's becoming one of our technology resources for everybody." This person had helped Mary learn how to use specific technologies prior to Mary's taking her students to the lab.

Mary and Ellen took their classes to library media center computer labs that were not staffed by full-time technology specialists; however, in both schools the library media specialists and/or their paraprofessionals were nearby. They talked with the teacher a little and were available to help but did not interact with students.

Support by other teachers was a factor. Mary said many other teachers, especially the English department head, are quite technologically capable, "So I know I always have people to ask." Nancy cited the leadership of her department head who "is very into wanting us to kind of learn things and motivates us to better ourselves to find ways that we can teach that really would motivate our students." Not only was the department head supportive; in addition, the entire department had decided that all first year foreign language students would be required to work in the foreign language computer lab at least once a week. Both Nancy and Ellen explained how they had collaborated with other teachers. Nancy and a middle school German teacher had been developing a web site to

be used for enrichment by all first year German students in the district. Ellen worked with another Spanish teacher to create activities their students could access via Quia.

Technology personnel. Although part of building and district support, leadership and assistance provided by technology support personnel deserves to be acknowledged separately. These people were not only mentioned by four teachers, but they were also observed assisting teachers and their students. These support personnel included:

- Paraprofessional lab supervisor
- Technology person in lab
- District and building technology people (not necessarily in the lab).

The foreign language computer lab in Nancy's school was staffed with a full-time paraprofessional who had previous computer experience. This person schedules classes and students, monitors and assists students. In addition, foreign language teachers and this paraprofessional discuss assignments ahead of time so the paraprofessional knows how to assist students and answer their questions. A paraprofessional lab supervisor was also available in the library computer lab in Linda's school.

The assistance of a technology person in the computer lab was perceived as a contributing factor, especially when that person interacted with students. Both Linda and Donna talked about the help this person provided. Donna admitted that this person was "just a salvation to me....He makes things so easy." She said she simply has to notify him in advance and he makes sure students can access the software or Internet. He also makes a point to help when classes first arrive in case any students have difficulty logging in. Donna said she could ask this person for help at any time. "He really makes

things easy for people here." Likewise, Linda referred to the library's technology specialist and how this person and Linda collaborated on instructional activities.

It was not only the assistance of paraprofessionals and technology specialists that made a difference, but more important was the fact that these people interacted with students. The paraprofessional supervisor in Nancy's lab not only monitored attendance and behavior, she also was observed assisting students with assignments. Throughout the time Linda's Spanish students worked with iMovie, the technology specialist was in the lab and actually taught the entire class how to use this software. This person had planned the activity with Linda and even visited Linda's classroom when her students gave the presentations that included the iMovie public service announcements they had made. In addition, the paraprofessional lab supervisor was present whenever Linda's classes worked in the lab. The supervisor helped students use equipment such as the scanner and could identify those computers on which iMovie had been loaded. This person also helped another class and drop-in students when they arrived in the lab, making sure they used only those computers Linda's students did not need. The technology person in Donna's school helped students log in and out, set up short-cut icons to the old French Lingo software and assisted students in navigating the Internet. He did not always stay in the lab because he needed to help teachers and students in other parts of the building, but he was always in the lab to greet students and help them when they arrived and as they left.

A building and/or district may have a technology specialist who works behind the scenes but does not assist students. In Nancy's school this person helped with the

technical processes associated with Blackboard, set up special e-mail addresses for her German classes, made sure that shortcuts for diacritical marks were available in e-mail. Linda said her building's technology consultant "does a good job of trying to let us know what's available."

In-service staff development. Staff development was cited by four teachers as contributing to their use of technology. Teachers in Mary's district were required to participate in three technology workshops each year. Nancy's district offered a variety of technology in-service courses and surveyed teachers about courses they would like to have offered in the future. Nancy said, "The next semester they'll probably offer something that you can take to learn those things. So they're very into wanting us to learn those things." In Linda's building technology specialists had asked teachers who were knowledgeable about certain technologies to teach other teachers how to use those technologies. The people who taught other teachers weren't always the building technology leaders but were classroom teachers who knew how to use technology and integrate it into their teaching. The technology people and lab supervisor keep teachers informed about technology offerings and do some training themselves. In addition, Linda's building has a technology committee that makes decisions about hardware and software purchases as well as staff development courses. Rachel's building had offered a PowerPoint course. Following the course, teachers received a stipend if they had their students create PowerPoints.

Access. Having access to computers was considered a contributing factor by five teachers. In two schools, recent renovations included new computer labs. Donna's

school had added two general-purpose computer labs and a new library media center in which all computers could access the Internet. These two computer labs were in addition to the computer lab in which computer courses were taught. The school also had two presentation rooms with projection systems students and teachers could use for giving PowerPoint and other presentations.

The library media center computer lab in Linda's school was open to students from 7:00 a.m. to 3:30 p.m. Students could work in this lab before or after school or during their free periods. Similarly, Rachel's students could also use computer labs during study halls and free periods.

Nancy said, "Facilities are wonderful." Students in her school were fortunate to have a lab designated specifically for foreign language students. This lab had 25 computers and a full-time supervisor. Foreign language teachers could reserve this lab for their classes, and students could drop in during their free periods. According to Nancy, the building's schedule provided students with ample time to work on assignments. In Ellen's school, foreign language and English teachers shared one lab located between the English and foreign language offices. Although it was adjacent to both offices, it was not supervised by anyone. This lab was to be reserved by these teachers for their classes; therefore, it was unavailable to students on a drop-in basis.

Linda's school was the only school in this study that had purchased computers to be used specifically in foreign language classrooms. The foreign language department had purchased 10 wireless computers and placed them on carts teachers could move from room to room. These computers were connected to the school's network by a wireless

hub and, although the signal wasn't reaching Linda's classroom, she proposed a solution to the problem and was excited about the possibility of using these computers in the future.

Personal acquaintance with teacher in other country. Although this factor was mentioned by just one teacher, it is important to note because it enabled her German students to communicate via e-mail with pen-pals in a German school. Several years before, Nancy had met a teacher from Germany and maintained communication with her. Because of this personal relationship, Nancy was comfortable in arranging for Internet pen pals between her German students and this teacher's students in Germany.

Internet filters. Before discussing inhibiting factors, it should be noted that, although all five public schools had installed Internet filters, none of the teachers in this study expressed any difficulty with filters. When asked if her school used filters, Rachel said, "Thank goodness," and laughed. Linda had been apprehensive that the filters might prevent access to appropriate sites, but she had not heard complaints about this. She said if she planned to use certain web sites and found them blocked, then she found new sites and modified her searches. In her initial interview when she cited a variety of technical problems, Ellen mentioned wondering if a site might be blocked; however, she never talked about this actually happening nor was this observed. The only teacher who expressed any concern about filters was the teacher in the private school that did not have filters. Her comments were simply based on supposition since she had not had any experience with filters.

Inhibiting factors. Teachers provided a variety of responses when asked what factors inhibited their use of technology. Some factors mentioned as contributors were also mentioned as inhibitors but from a different perspective. Four inhibiting factors were mentioned by nearly everyone:

- Cost of technology
- Limited access to technology
- Insufficient time
- Technical problems.

Cost of technology. Cost was mentioned as an inhibiting factor by everyone except Nancy. This factor included general references to lack of resources in the school and a feeling that so much more could be done with technology "if we had the money" or that a school has to have "big bucks" in order to purchase the necessary technology. Four teachers specifically cited subscription costs for Internet services such as Quia, Blackboard and some WebQuests. Donna, Ellen and Linda all said they had used Quia in the past when it was available at no cost; however, they either no longer used it or used it very little because of the fees Quia currently charged. Linda said Quests such as AmazonQuest and MayaQuest were becoming more costly since they were now part of Classroom Connect. Ellen had not had to pay to use Blackboard as long as she kept it updated; however, more features were provided to persons who paid Blackboard's site fees. She hoped the state or her district would purchase a license so she could continue to use this method of curriculum delivery. She also referred to the fees for WebCT, another Internet curriculum delivery service.

Cost of software, especially to purchase multiple copies, was also mentioned. Donna had used a networkable drill and practice software now available only on CD-ROM; however, each cost approximately $70, and the school could not afford to purchase several copies, certainly not enough for each student. Linda's school had purchased multiple copies of Inspiration ($30 each) to use in the computer lab; however, it took nearly three years to purchase the software. Linda said it was important to purchase enough copies of software in order to teach students how to use it to the point that they become comfortable with it. She explained what happened when there weren't enough copies for each student:

> You're having to either give full instructions to everybody and then only part of them will actually get to do it right then. Or you have to devote all your time to that small group and you're not available then for the other groups.

Donna, the only teacher who did not have a computer in either her classroom or office, talked about hardware costs. She said although her building had a wireless network, teachers did not have computers in their classrooms because the school's first priority was to provide computers for students, especially in labs.

Access to technology. Access is closely related to cost. In fact, limited access is often but not always, a function of the difference between cost and monies available. All six participants talked about the limited availability of computers in classrooms. Three teachers had no computers in their rooms. This included Rachel who, although a computer was mistakenly placed in her classroom for just a few weeks, for all practical purposes had no computer in her classroom permanently. Rachel had been given the

choice of having a computer in her classroom or in her office. She chose the latter even though her office was next door to her classroom. Whenever Rachel wanted her students to use computers or when she wanted to teach students via computer, she had to take her classes to the lab.

Nancy's access situation was similar. She had a wireless laptop computer on the desk in her office. She could have used this computer in her classroom and projected by connecting her computer to a television monitor but had not yet done so.

Even though her building was wireless, no teachers in Donna's school had computers in their classrooms. Some students had been given laptops and all had access to computer labs. Donna's French students had weekly in-class and out-of-class writing assignments but did not write with word processors in class because the class would have had to go to the lab each time.

Mary, Ellen and Linda each had a computer in her classroom; however, they all thought limited access inhibited their use of technology. Having just one computer enabled only the teachers to use technology. Since Ellen's computer was connected to television monitors, she could project her PowerPoints or those of students. Neither Mary nor Linda had any type of projection capabilities. In fact, Mary thought she had one of the older computers in her school. It was slow and did not have upgraded software.

Another type of access problem was reserving lab time for classes. The only teacher who did not mention this was Mary. Rachel said even though her school had four labs that could be used by all classes, it was still necessary to plan well in advance. Linda

said technology-integrated activities take a lot of time and students sometimes had to complete projects outside class because she was unable to schedule lab time. Donna said access had been a problem in the past but wasn't much of a concern now because more labs had been added during building renovation. Similarly, Nancy said access to a lab had been a problem in a school where she had previously taught because that school had only one computer lab. In Ellen's school, several foreign language teachers shared a lab with several English teachers, resulting in frequent scheduling conflicts. Even though she could take her classes to the library computer lab, so could all other teachers in her school. She perceived access as a significant problem.

Access was exacerbated by some building schedules. If students were not allowed to schedule study halls, they had little free time during the school day in which to utilize computer labs or library media centers. When class periods were short, teachers had to plan carefully to ensure they were not in the midst of an activity when the bell rang. If a teacher did not meet with the same students in class each day, it was difficult to plan projects in which students collaborated during class time.

Insufficient time. Lack of time, mainly the time necessary to learn technology as well as the time required to plan technology-integrated instruction, was cited by all of the teachers except Rachel as being a factor that inhibited their use of technology. Teachers need time to explore, find out what technologies are available, learn how to use them and then determine ways to integrate those technologies into teaching and learning. Both Mary and Linda said teachers need time to learn how to use technology. In fact, Linda said it was the main inhibitor, "What it really comes down to, again, is having the time,

whether it's the teachers learning the programs or the teachers learning what's available. You still have to have time."

Several teachers referred to time needed to plan and develop instructional activities that integrate technology. When Nancy described the online German I course she and a middle school teacher were creating, she said it would take the two of them at least a year to develop the course, which was just a way of delivering enrichment activities. It was not meant to deliver the entire German I curriculum. Even when they finished, Nancy said they would need to review all their work and revise parts of it. Linda had incorporated several WebQuests into her teaching and said more teachers would like to use them; however, "in the reality of things, unless you're willing to make that time commitment, to really try to figure out how you can use it and you're comfortable with the technology, most people don't go ahead and do them."

Donna specifically said it took a lot of time to plan directed Internet searches. Because URLs change, she double-checks sites frequently and, if the URL is not current, she updates the URL or finds new sites. She described how excited she was when she first used technology. She modified drill and practice software by entering vocabulary and grammar from lessons she was teaching. She began to wonder if the time she spent on this was worth the effort, "If you could do it with a paper and pencil as well, why am I doing this?" Both Ellen and Linda referred to the amount of time it took to maintain their own web sites. This time was the reason Linda no longer had a web site. Ellen admitted she didn't update hers as much as she should. Because she had previously created her grammar and vocabulary PowerPoints, she could easily link them to her Blackboard site.

She said this did not take a lot of time, but using WebCT or Blackboard did. On the other hand, when she talked about the fact that she was doing the same types of things as other teachers but in a different format, she admitted she was spending a lot of extra time on technology.

Linda also talked about time for technology taking away from time needed to get through the curriculum. She felt it was less time consuming and easier to play a board game or do a textbook activity than to do a similar activity using a CD-ROM. Although she would prefer to have her Spanish students use the CD-ROM, "I've got to get through the material." Her Spanish IV students did a lot of work on their iMovie public service announcements outside class because of limited accessibility to the lab and "because I couldn't afford to give them that much time out of what I needed to do with the rest of the curriculum."

Technical problems. Technical problems, as might be expected, were cited by most teachers as an inhibiting factor. Although Linda seemed quite knowledgeable about technology and had developed back-up plans in case technology did not work, she felt other teachers had low tolerance for technology problems and, because they refused to develop alternate plans, did not use technology. She knew some teachers who had designed entire plans around technology and when the technology didn't work, just gave their students a study period. In her mind, this was an unacceptable alternative.

Technical problems included power outages and network problems. A network could be down. In Linda's classroom, the wireless network did not work. Some classrooms had limited network drops. One school had to be very careful to load

software on only specified computers because of limited space on the server. In three schools, students were observed who forgot their passwords; therefore, students had difficulty accessing the software and/or saving their documents properly. In Ellen's school, the security software caused computers to shut down. When this happened, students lost their work, so they needed to save frequently. Ellen hoped that when this software was upgraded, it would not cause this problem.

Sometimes school computers had limited capabilities or were incompatible with software teachers wanted to use. For instance, Linda felt district offices usually had the latest computers, but those in buildings, especially in classrooms, were not compatible with software. Rachel talked about drill and practice CD-ROMs that were not compatible with her building's new computers. Ellen felt the computers her department had purchased were not up to par and limited what her students could do. Linda cited slow computers and other technical problems. Both Rachel and Linda had experienced computers that froze when too many windows or programs were open. Linda and Ellen also mentioned the inadequate audio capabilities of their computers.

Most teachers had experienced problems with the Internet, either that it was not functioning or was functioning very slowly. Linda said her students were impatient and that, if an Internet site did not come up immediately, "they lose interest and then they start doing off-task behaviors." Donna knew the Internet could not handle an entire class using Quia simultaneously, so she used other non-Internet drill and practice software and limited Quia to only a few advanced students and also encouraged students to use it at home. Ellen said in previous years WebCT was down a lot so she seldom used it.

Other Internet problems included problems with specific web sites: changes in URLs, delays in posting on Quests, being unable to download information written in Japanese characters, and the slowness and errors associated with WebCT.

Cost, access, time and technical problems were the inhibiting factors mentioned most frequently by most participants. Other inhibiting factors were not mentioned by as many teachers. Just the same, they warrant inclusion in this discussion. These factors include:

- Lack of appropriate software
- Learning curve
- Problems with e-mail pen pals
- Students not using time wisely
- Technology support person not available or not helpful
- Language too advanced for students.

Lack of appropriate software. Not having appropriate software, either for the language or to be compatible with hardware, was a problem for two teachers. Mary would have liked to have Japanese word processing software so she could create overheads displaying these characters or to enable students to write. This was more of a problem for her in preparing teaching materials rather than for her students. She felt first-year Japanese students first needed to acquire the skill of hand writing these characters; however, this software would be appropriate for upper levels of Japanese. Ellen felt limited in what she could do with technology because her building used only Windows

computers. She felt iMovie was easy to use, both for students and teachers; however, it was not compatible with Windows computers—only with Macintosh computers.

Learning curve. The learning curve is not just a matter of time; it also reflects teacher attitude, resistance to change or simply lack of knowledge. Linda said if teachers were unwilling to commit the time or were not comfortable with technology, they simply would not try to use it. She followed by saying:

> A lot of teachers are reluctant to use technology because they don't know it themselves. And they are under the impression that they have to know how that technology works in order to have the students do it. It sure helps, but it's not a requirement.

In other words, teachers can use technology with their students or have students use technology even though teachers have limited knowledge of the technology themselves. Nancy talked about the learning curve as being more of an attitude. She said some teachers "are still very book oriented and some of them just don't want to bother with [technology] because they don't know how to set it up. I think teachers are afraid to use it sometimes because they just don't know it."

Problems with e-mail pen pals. Finding e-mail pen pals and monitoring student e-mail were reasons more teachers did not have their students participate in e-mail exchanges with students from the target language countries. Linda said she would like her Spanish III students to have e-mail pen pals; however, she had not found a match for her students. Rachel said when her French students had previously exchanged e-mails

with pen pals, she had to closely monitor the e-mails. Her students were not currently exchanging e-mails; however, she might resume this activity in the future.

Students not using time wisely. Students not using their lab time wisely may be a reason some teachers would be reluctant to continue having their students use technology. All first-year language students in Nancy's school were required to spend one period a week in the computer lab. Nancy said some students did not use this time wisely. In addition, she said some students would complete only the bare minimum requirements on these weekly assignments and, even if they had plenty of time, would not go back and review or re-do assignments. For instance, in one observation a boy had provided only 16 correct responses out of 35. He did not review or redo the assignment. He spent the remainder of his lab time on inappropriate, non-class activities.

Technology support person not available or not helpful. Not having a technology support person available in a computer lab was perceived to be a factor that might inhibit a teacher from taking a class to the lab. On the other hand, having a technology support person present but not involved with either the teacher or students can be just as inhibiting a factor. These factors were not specifically identified by the teachers; however, student engagement and performance were observed to be noticeably different when a technology support person assisted both the teacher and students.

Ellen's lab had no technology support person or supervisor. The English and foreign language teachers simply monitored their own students when they took their classes to this lab. The computer center in Rachel's school was staffed by two technology people who appeared to have responsibilities other than helping students.

According to Rachel, these two people "don't have very many interactions with students." One was responsible for all building technology. As far as the other person was concerned, Rachel said, "I really don't know exactly what specific job she has to do aside from managing the computer lab, making sure that students aren't on inappropriate sites." The only time this person was observed interacting with students was when Rachel asked the person to help a student who needed to retrieve a file from a computer in a different lab. These two people repaired equipment, responded to "help" phone calls and talked with each other. They did not interact with students and seldom talked with Rachel. They appeared to have no role in planning instruction or providing assistance to students. Their non-involvement was a direct contrast with the assistance provided to both teachers and students in Donna's, Linda's and Nancy's schools.

Language too advanced for students. In some instances, students' language skills did not match the skills required for specific technologies. This did not seem to be a big factor but was mentioned by three teachers. Linda said the Spanish of the speakers in some of the WebQuests was "beyond what my second language learners can do. Native speakers could use it fine, but to be able to do the things that I want my kids to do with it, we really can't use it in Spanish." WebQuests were mostly in English and because they were culturally based, Linda felt it was important to provide these opportunities to her students. Mary had been considering some cultural and geography technology projects; however, they did not match Japanese I students' limited speaking skills. These projects would be appropriate for Japanese II students.

When one of Nancy's students complained he could not understand the speakers on a CD-ROM, Nancy said, "You know why? We haven't had some of that vocabulary." The lab supervisor reminded the students to press the REPEAT button to listen to the speakers again.

Background and training. In addition to their beliefs about technology and factors teachers perceived as contributing to or inhibiting their use of technology, they were asked about their technology background and training.

Technology use during high school. The four youngest teachers talked about using computers while in high school but in different ways. Ellen said she had always enjoyed using technology, starting when she was, perhaps, in fourth grade using a computer at home. Having a computer at home was a big factor in her growing interest in technology. "It was always there. And it was a resource that I used on a daily basis." She had even programmed in LOGO before floppy disks were common. When she was a high school student, she used a computer to type papers but did not take any technology classes. Mary started using a computer for word processing and e-mail while she was in high school.

On the other hand, Linda said she first used computers when computers were relatively new in education. She was in high school then and took a BASIC programming class and a word processing class, the latter based on DOS in which one had to use imbedded commands to change font style, for instance. Although Rachel did not use computers in her high school (this was before the Internet), she had used the computer in her father's office to type notes and papers.

Technology use in college. Four teachers mentioned using computers in college. Three had used them as undergraduates. One of the factors influencing Ellen's college choice was that each dorm room had a computer. Internet and e-mail were becoming popular about this time. Ellen said, "It was really neat. I could e-mail my dad at work and he could e-mail me back." Rachel said she used computers in college to prepare reports. Using a word processor and printing on a laser printer made her reports look nice. In college Mary had to take a class to learn how to use the components of Microsoft Office: Word, Excel and PowerPoint. She also had to take an educational technology course.

Two teachers mentioned using computers in graduate school. While she was working on a master's degree, Donna took an introduction to technology class. Ellen chose to focus on technology for her master's degree. This was during the mid- to late-90s when educational technology became more accessible to teachers. She had been exposed to PowerPoint on her father's computer and was eager to learn new ways of using technology. In addition, during this time she became interested in developing online classes and was intrigued with the opportunities technology presented.

Technology use as a teacher. Five teachers described their first computer experiences and how they developed an interest in technology over a period of time. During the first year Rachel taught in her building, she also supervised the computer lab. The first time her students used computers was for grammar drills on an Apple computer with 5¼" floppy disks. The first computer project her students did was a Paris project

that Rachel modeled this after a project she had created when she was in high school; however, at that time she simply used her teacher's Paris slides.

Nancy described exploring web sites as her first use of computers in the mid-90s. She found this very interesting even though she did not consider herself a technologically oriented person. "I started using it a little bit then just to see...to explore some sites." She said she never felt comfortable with machines but has tried to overcome this feeling.

Linda had always been interested in technology and first used it herself just "to create things for students or to facilitate what I was doing as a teacher. And as technology developed, I'm having the kids use it, too." She had given WebQuest presentations and had conducted in-service sessions on using Inspiration as a teaching tool. Linda said because she had a knack for technology and was not afraid of it, other teachers would ask her questions. She said computers seemed to work the way her brain worked. She liked "manipulating things and creating a final product." Personally she had been "willing to invest in something that would help my life," for instance, using a VCR at home to edit out commercials. This attitude carried over to how she explored and used technology at school.

"When computers first came into being, I was enamored of them," said Donna. She had even written some simple grammar programs for TRS 80 computers that her principal had purchased for her school many years ago. With a little encouragement from her principal, Donna was hooked. Technology simplified her life. "I liked it. It was interesting and it was a way to teach what you've taught and give a new perspective and

give the kids some interest. And when you've taught for [a long time], you get bored, too."

As one of the younger participants, Ellen said she had used technology most of the time she had been teaching. She didn't perceive herself as being different from teachers who weren't using technology. During her first year of teaching her technology use was mostly limited to word processing and a computer grade book. She had been a technology leader for her building and teaches in-service classes on the use of technology, specifically the integration of technology into foreign language instruction.

Technology training. The teachers described the types of technology training in which they had participated, not only as teachers but also in high school and college.

High school and college courses. Three of the teachers said they had taken some technology classes in high school. Ellen's first typing class was taught on a computer. Mary and Linda took a word processing course as well as a computer programming class in high school. Mary recalled taking an educational technology course and a Microsoft Office course as an undergrad student. Linda, Donna and Ellen all described their graduate courses in educational technology.

In-service staff development. Building and/or district provided technology staff development was a key factor for four teachers. Rachel had participated in a series of PowerPoint classes and sessions on how to use the Internet and e-mail. Following the PowerPoint classes, if teachers could show evidence of their students creating PowerPoint projects, the teachers were given a stipend. Nancy explained her district offers a variety of technology training and requires all new teachers to take a course that

includes technology. In the staff development classes Nancy had learned to use Blackboard and planned to take a PowerPoint class the semester following this study. Linda said she had participated in several technology in-service sessions and, through one of these, had learned to use the district's online students information system. Mary's district requires all teachers to take technology in-service courses. In these courses she has learned how to use PowerPoint, iMovie and a scanner.

Conference and workshop training. Both and Linda Mary had benefited from attending state and national technology conferences that focused on technology in language instruction. Linda said although she has taken technology courses, most of what she has learned has not been in formal classes:

> Once I've developed the interest, then I've probably taken some sort of class on it or played around with it enough that I can go ahead and use it. The class reinforces what I know and teaches me those little tricks.

Ellen, also, had participated in several university and commercial technology workshops.

Helping other teachers with technology. Linda and Ellen talked not only about technology training in which they had participated but also about their roles as building technology resource people. They had both taught in-service sessions and helped fellow teachers on a one-to-one basis. Linda felt this role was motivating but also intimidating. Ellen talked excitedly about the progress one of her teachers had mad:

> One of our teachers could barely turn on her computer and then she went to my class and she had this wonderful PowerPoint that she made. And

she's made several others. And now I'm working with her independently to do a project.

As a building technology leader, Ellen helps foreign language and English teachers. As knowledgeable as she is, she said she knows her limitations and often turns to technology support personnel for assistance. She taught classes in her building and district on integrating technology into foreign language instruction.

Little change in teaching. When asked if technology had changed their teaching, four teachers said it had either not changed their teaching or changed it very little. For instance, introducing vocabulary was accomplished by videocassettes or PowerPoint presentations rather than using an overhead projector. Ellen said, "I don't think technology has really changed the way I teach....It's just a different presentation mode." Similarly, Rachel said technology had not changed her style of teaching but had helped with classroom management. As mentioned above, Donna said her use of technology changed only in how frequently she uses it. Over time, both Donna and Linda had become more selective in their use of technology.

This section explained why these teachers use technology in instruction. When sharing their beliefs about the role of technology in instruction in general, teachers referred to purposeful use, technology as a motivational tool, providing a variety of instructional activities, impact on student performance, and the fact that students would need technology as a life skill. Some reasons also related to teachers' convenience. Teachers also mentioned reasons unique to foreign language instruction, primarily providing more and/or better opportunities to communicate in the target language and

providing authentic, current cultural resources. The section continued by describing factors that contribute to or inhibit teachers' use of technology, including the teachers' backgrounds and training. The section concluded by summarizing the teachers' comments that technology had only minimally changed in their teaching.

Recommendations for Administrators and Other Teachers

This study was conducted to help administrators understand how technology is used in foreign language instruction, as well as factors that influence whether or not, and to what degree, technology integration occurs. To allow for the possibility that some topic might not have been addressed, all six teachers were asked one final question, "Is there something else you would like to tell teachers or administrators about the use of technology in foreign language instruction?" The responses were not long. They reflected some of the same issues the teachers had previously addressed:

- Access
- Time
- Hardware and software issues
- Teachers have to have a back-up plan.

Access. Providing access seemed to be a key issue throughout the interviews. Two teachers who did not have computers in their classrooms felt teachers should have computers in their classrooms and that computers should be readily available to students in computer labs. Donna said computers should be available to teachers and students at all times. Similarly Rachel said:

> It's good for the students to have access to it and use it as much as possible because it's what they're probably going to be using when they go out into the real world. Whatever they do in the foreign language classroom is going to translate to their work environment.

One school had a computer lab dedicated to the foreign language department. The teacher in the school where foreign language and English shared a computer lab thought it would be important for administrators and other teachers to see how such labs could be used in foreign language instruction. Ellen suggested when new schools were designed or when curriculum was developed the people in charge ought to include foreign language computer labs so students can learn the language interactively with computers.

Time. Time for exploring and learning new technologies, as well as time for planning and developing the integration of technology was another common theme throughout the interviews. Time also included staff development. Linda explained, "It does no good for us to learn how to use this technology if we don't have the opportunity to do it....Need time to explore, practice, see what's available, then create projects we would like to do." She continued:

> Just giving us a couple hours here to go, "Ooh! That would be a really neato program," but then never going back and giving us time to work with it or going back to, "OK, now here's an update...." It's not done in isolation. "OK, how does this align with what I'm supposed to be teaching?"

Mary also stressed the amount of time it takes to learn how to use technology. She said, "Provide some way for teachers to keep up with what's going on and have access…either access to it, training mainly—have to have proper training."

Hardware and software issues. Students would benefit from having more software in the target language and having enough copies for multiple computers so that entire classes, or significant numbers of students, could use the software at the same time. Rachel thought having programs such as Microsoft Word and PowerPoint available in the target language would be useful. Linda said although Inspiration costs only $30, that was for just one copy. She said that to be an effective instructional tool, multiple copies should be purchased, at least enough to have on a few computers in a classroom where the teacher has set up learning stations. She also mentioned a three-year delay in getting this software on the school's computers.

Linda and Ellen stressed the importance of having up-to-date hardware compatible with software. Linda felt her district tried to excite teachers about using technology, but when they returned to their buildings the hardware wasn't compatible with the new software. In addition, Ellen felt her department had not purchased the best quality computers.

Teachers have to have a back-up plan. This advice was directed more at teachers than administrators; however, administrators need to be aware of this important admonition. Although only one teacher mentioned back-up plan here, others referred to it earlier in their interviews. It is absolutely imperative to have a back-up plan in case something does not work. This would be true of any instruction but is even more critical

when using technology. "It makes it more pronounced because if you have your whole lesson plan designed around that piece of technology and it doesn't work, you can't just give [students] a study hall," Linda stressed.

Summary

This chapter presented the results of the study. The data collected from interviews and observations were organized into themes that surfaced as the interview transcripts and observation notes were analyzed.

Because the study's grand tour question, "*How* and *why* do high school foreign language teachers use technology in instruction?" consists of two parts: *how* and *why*, it seemed only natural to examine the data in light of each question. Descriptions of *how* the participants and their students use technology appeared first. These descriptions looked at how the teachers used technology themselves; however, the main focus was on how their students used technology. Then followed a discussion of the teacher's role during this instruction and the teachers' reflections on these activities.

How teachers use technology themselves. Three teachers had a computer in their respective classrooms. Three did not. Of these, two had a computer in their offices. The other had no computer in her classroom, nor did she even have an office; however, she could use a nearby computer lab. The teachers all had TV/VCRs and cassette/CD recorders/players in their classrooms.

Management. The teachers used computers for a variety of management tasks:

- Document preparation (tests, quizzes, PowerPoint presentations, assignments, directions for projects)

- Recording grades, using student information management system
- Searching the Internet (research, planning WebQuests, verifying URLs for student searches)
- E-mail
- Providing class information to students and parents online.

Instruction. Teachers said they used technology for instruction and/or were observed doing so; however, use by teachers was not observed or mentioned nearly as often as use by the students themselves. Four teachers created PowerPoint presentations for their classes and a fifth said she would soon be learning how to do so. PowerPoints were used to introduce vocabulary, sometimes with the teacher's pre-recorded voice pronouncing words. PowerPoints and video clips introduced students to different aspects of the target culture. Teachers used video and audiocassettes/CDs to enable students to hear native speakers. Three teachers mentioned ways in which they made lessons available online. Two of them did this via Blackboard; two teachers had created their own web sites. Overall, teachers said technology had changed their teaching very little, if at all.

How students use technology. Although students used a variety of technologies, the most prevalent involved the Internet, which students used in many ways:

- Research (sometimes to find information for a project such as a PowerPoint presentation, booklet or video)
- WebQuests (inquiry-based Internet research activities)
- Grammar and vocabulary practice

- Assignments
- Quizzes
- E-mail pen pals
- Access teacher web site.

Students also watched videos, listened to audiocassettes and CDs, created PowerPoint presentations to show to their class and used other software such as Inspiration (a graphic organizer) and iMovie (a video editing program). Some students did activities using CD-ROM textbook ancillaries and other drill and practice software.

The main purpose for using technology was to facilitate student understanding of the target culture. The Internet is especially helpful in this regard because it can link students with a wide variety of current, authentic resources they could not otherwise experience. Although technology was used for some vocabulary and grammar activities, that did not seem as prevalent as the culture applications.

Teacher's role when students use technology. Much of this discussion dealt with the amount of guidance given students when they conducted Internet searches. This varied from teacher to teacher and even from time to time for a single teacher. The most directed search consisted of the teacher's providing specific web sites from which students found all necessary information. At the opposite end of the spectrum were activities in which students were to utilize search engines and were not provided any URLs.

The interviews and observations provided other insights into the teacher's role when students used technology. Teachers stressed the importance of providing clear, thorough directions and grading criteria. Planning was also stressed and included:

- Checking URLs in advance
- Knowing how to use the software students were to use
- Being prepared to keep all students engaged throughout the period (accommodating for slow students and students who finish early)
- Having a back-up plan in case the technology did not work (being flexible).

All teachers monitored students as they worked in computer labs. This consisted of both general oversight and providing technical assistance. It was important for teachers to interact with students in the classroom and in the computer lab. Interaction could consist of direct instruction, assisting individual students and small groups or even just providing encouragement and acknowledging student success.

Students' knowledge of technology. The teachers all complimented students on their knowledge of technology, saying they helped each other and often assisted the teacher or showed the teacher how to use new technologies. For the most part students were well behaved in class and the computer lab; however, some came to class unprepared and did not use their time wisely.

Why teachers use technology: general beliefs. The second part of the grand tour question—*why*—was answered by revealing the teachers' beliefs about the use of technology, both in general and specific to foreign language instruction, describing the

teachers' technology backgrounds and training, and reporting on those factors teachers felt contributed to or inhibited their use of technology.

Why teachers used technology seemed to fall into six categories:

- Purposeful use (a tool, not the end in itself)
- Motivate students
- Provide a variety of instructional strategies
- Improve student performance (mixed opinions)
- Technology would be needed as a life skill
- Teacher convenience.

Beliefs specific to foreign language instruction. Technology assists in foreign language instruction because it:

- connects students with current, authentic resources,
- helps students develop an understanding of the target culture, and
- provides improved ways to communicate with native speakers and writers.

When asked why they used technology, teachers referred to improved student performance and better quality student work. On the other hand, teachers had mixed opinions about whether or not technology affects language acquisition.

Contributing factors. When teachers were asked about factors that contributed to their use of technology, their responses clustered into the following themes:

- Student familiarity with technology
- Abundance of Internet resources
- Improved and/or user-friendly technology

- Building and/or district support (principal, library media specialist)
- Technology personnel
- In-service staff development
- Access to computers (computer labs, library media center, wireless mini-lab for foreign language department)
- Personal acquaintance with teacher in another country (to arrange for student e-mail pen pals).

Inhibiting factors. Four inhibiting factors were cited by all teachers:

- Cost (computers, software, online subscriptions)
- Access to technology (no computer in classroom, having just one computer in the classroom, competing for lab time with other classes)
- Time (to learn and practice new technology, explore, integrate into teaching, develop instructional activities)
- Technical problems (power outages, network problems, limited network drops, incompatibility of software and hardware, students forgetting passwords, Internet not functioning or functioning slowly, changes in URLs).

Background and training. Several teachers had used technology in high school and college, some simply for word processing, others for more advanced applications. Teachers described their first use of computers in teaching and stated their interest in technology had developed over a period of time. They had taken high school and/or college technology classes. Most stressed that building- and/or district-provided staff

development was a key factor in their use of technology. Several teachers said they had attended technology conferences and workshops. Two had been designated as building technology leaders.

Recommendations for administrators and other teachers. Finally, the chapter concluded by summarizing suggestions these teachers made for administrators and other teachers regarding technology. These recommendations were short and reflected issues already cited as contributing or inhibiting factors. They included:

- Provide adequate access to technology
- Provide time for teachers to learn new technologies, explore, plan and integrate technology
- Provide up-to-date software compatible with hardware, often multiple copies, available in target language
- Must have a back-up plan.

This chapter presented the results of the study. The next chapter will draw conclusions from these results, relate conclusions to the literature, consider implications of both the results and the conclusions, and offer suggestions for further research.

CHAPTER 5

Conclusions

Introduction

This chapter briefly reviews the purpose and methodology of the study; however, the chapter's focus is to summarize and interpret the results and discuss implications for further research and practice.

Statement of Purpose

The purpose of this qualitative, exploratory study was to develop an understanding of *how* and *why* high school foreign language teachers use technology in instruction. The study focused on foreign language teachers' use of technology as an instructional tool, creating an environment in which their students use technology in the learning process.

The grand tour question for this study was: *How* and *why* do high school foreign language teachers use technology in instruction? This question consisted of three subquestions:

- How do these teachers use technology in instruction?
- Do these teachers' students use technology as part of their learning experiences?
    - If yes, how?
    - If yes, what is the teacher's role when students use technology?
    - If not, why not?
- Why do these teachers use technology?

- What beliefs do they have about the role of technology in instruction?
- What factors contribute to or inhibit the teachers' use of technology?
- What technology background and training do the teachers have?

Review of Methodology

The study used a qualitative design involving content analysis and interpretation of natural data. Six foreign language teachers, teaching four different languages (French, German, Japanese and Spanish), each from a different school district in a Midwestern state, participated in this study. Each was interviewed twice and observed several times during the 2-month data-gathering period. Forty observations were conducted. In addition, each participant provided brief, introductory information in a Preliminary Information Form.

Two forms of natural data were collected for each participant throughout the study: interview transcripts and classroom field notes. Uniform interview protocols were used for both the initial interviews and the shorter wrap-up interviews. These interviews were recorded and transcribed. Each participant read and commented on her interview transcripts. Observation field notes were typed.

The constant comparative method was used to analyze interview transcripts, observation field notes and Preliminary Information Forms. Coding was a lengthy, tedious process that, in essence, consisted of four phases: initial coding; reorganizing data into a second pass outline; condensing codes into a third, long outline; and creating a final, streamlined outline that provided the structure for reporting the results in Chapter 4.

Summary and Discussion of Results

Because the study's grand tour question, "*How* and *why* do high school foreign language teachers use technology in instruction?" consisted of two parts: *how* and *why*, it seems only natural to examine the data in light of each question. Descriptions of *how* the participants and their students use technology appear first. These descriptions explain how teachers used technology themselves; however, the focus was on how they worked with students on technology-integrated learning activities teachers had created.

This exploratory study sought to develop an understanding of a phenomenon; therefore, one should refrain from concluding that the findings are necessarily generalizable to a broader population.

Technology resources available in teachers' classrooms. Before summarizing themes that emerged from the interviews and observations, it is important to note the types of technology available in each teacher's classroom. Three teachers had computers (one each) in their respective classrooms. Three did not. Of these, two had computers in their offices. The other had no computer in her classroom, nor did she even have an office; however, she could use a nearby computer lab. The teachers all had TV/VCRs and cassette/CD recorders/players in their classrooms.

These six teachers used technology for a variety of management tasks and some aspects of instruction. More importantly, they designed instructional activities in which their students used technology. Teachers and their students used computer technology despite the fact that three teachers had just one computer in their classrooms and three had none.

How teachers use technology themselves. Answers to the *how* questions clustered into the following themes:

- Teachers used computer technology to manage their classes and/or prepare instructional resources.
- Teachers and their students used computer technology in instructional activities.
- Teachers reported that they and their students use videos, audiocassettes and CDs.
- All classes used the Internet at least once during the observations.
- The most prevalent use of the Internet was to link students to current, authentic resources to help students understand the target culture.
- Teachers used a wide variety of instructional activities, both those that integrated technology and those that did not, within a single class period.

Management. Teachers used computers for a variety of management tasks:

- Preparing materials (tests, quizzes, PowerPoint presentations, assignments, directions for projects)
- Recording grades, using student information management system
- Searching the Internet (research, planning WebQuests, verifying URLs for student searches)
- Using e-mail
- Providing class information to students and parents online.

Instruction. Teachers said they used technology for instruction and/or were observed doing so; however, teacher use was not observed or mentioned nearly as much as student use. Four teachers created PowerPoint presentations for their classes, and a fifth said she would soon be learning to do so. PowerPoints were used to introduce vocabulary, sometimes incorporating the teacher's prerecorded voice pronouncing words. PowerPoints and video clips introduced different aspects of the target culture to students.

If much of teachers' instructional use of computer technology is limited to PowerPoint presentations, is this simply a 21st-century imitation of the overhead projector, one that is a lot more costly? Do teachers present information via PowerPoints simply for their own convenience? If this is the extent of teachers' instructional use of computer technology, how can we justify our investment of time and money? Or is this a slow revolution, as Larry Cuban (2001) explains, and real change in teaching with technology is yet to come? These teachers' admissions that technology had changed their teaching very little, if at all, is aligned with Cuban's conclusion that even in classrooms where computers are used, "the overwhelming majority of teachers employed the technology to sustain existing patterns of teaching, rather than to innovate" (p. 134).

Teachers used video and audiocassettes/CDs to enable students to hear native speakers. Three teachers mentioned ways in which they made lessons available online. One simply posted assignments on the school's web site. Another utilized Blackboard. A third used both Blackboard and her own web site, which was part of the school's web site.

All teachers stated that watching videos and listening to native speakers on audiocassettes and CDs occurred on an ongoing basis throughout all their classes. Students were observed doing this; however, the most frequently observed use of technology was students searching the Internet to develop their understanding of the target culture. The wide variety of current, authentic Internet resources makes it a natural tool for connecting students with other cultures. The Internet was used for research, grammar and vocabulary practice, taking quizzes, sending and receiving e-mails from pen pals and accessing the teacher's web site. Another finding was that when they taught in their classrooms, teachers engaged their students in several learning activities within just one class period. Technology was integrated into some of these activities but not others.

My observations did not include the full range of these teachers' classroom activities. Even though technology was incorporated in all observed classes and students used technology in many activities, based on these observations alone, I would not describe these classes as technology-rich learning environments.

How students use technology. Students watched videos, listened to audiocassettes and CDs, created PowerPoint presentations to show their classmates and used other software such as Inspiration (a graphic organizer) and iMovie (a video editing program). Some students participated in activities using CD-ROM textbook ancillaries and other drill and practice software. Although the Internet and CD-ROMs were used for some vocabulary and grammar activities, this use did not seem as prevalent as the culture applications.

The main purpose for using computer technology was to facilitate student understanding of the target culture rather than to assist in language acquisition. Students used a variety of computer technologies, mostly the Internet, which students used in many ways:

- Conducting research (sometimes to find information for a project such as a PowerPoint presentation, booklet or video)
- Conducting WebQuests (inquiry-based Internet research activities)
- Practicing grammar and vocabulary
- Completing assignments
- Taking quizzes
- Communicating with e-mail pen pals
- Accessing teacher web site.

The Internet is especially helpful for learning about other cultures because it can link students with a wide variety of current, authentic resources students could not otherwise access. All six teachers mentioned, and their students were observed, using the Internet to find information on different aspects of cultures they were studying. Research on college-level Internet use indicates using the Internet to learn about the target culture is the most common application of computer technology in foreign language instruction (Abrams, 2002; Gardinali, 2002; Osuna, 2000; Osuna & Meskill, 1998). These studies found using the Internet enhanced learning about culture by providing current, authentic resources; taking advantage of text, sound and visuals; capitalizing on different learning

modalities; and increasing motivation. It appears this use occurs at the high school level as well. The teachers in this study cited the same benefits.

Teacher's role when students use technology. Teachers talked about their role when students used technology. Much of what they said dealt with the amount of guidance given students when they conducted Internet searches. The amount varied from teacher to teacher and even from time to time for a single teacher. The most directed search consisted of the teacher's providing specific web sites, both in English and in the target language, on which students found all necessary information. At the opposite end of the spectrum were activities in which students were to utilize search engines and were not provided any web sites.

Some teachers had designed WebQuests or given specific web sites where students would find all the information they needed. Four teachers said their students had used guided searches. Some teachers asked students to search on their own without being given any web sites. Some assigned semi-directed searches. Teachers had utilized and learned from their experiences with all three methods (directed, semi-directed and learner-determined) and said the method they chose depended on the students' capabilities, the amount of time available and the purpose of the activity. This variety in design of Internet-based activities is reflected in the literature (Brandl, 2002; Walz, 1998). While Walz simply described these types of activities in terms of how many web sites are given to students, Brandl labeled these methods as teacher-determined lessons, teacher-facilitated lessons and learner-determined lessons and concluded that teacher-

facilitated lessons seem to be the most popular with students and teachers. Teacher-facilitated lessons lie in the middle of the minimum- to maximum-structure continuum.

The interviews and observations provided other insights into the teacher's role when students used technology. Teachers stressed the importance of providing clear, thorough directions and grading criteria. Planning was also stressed and included:

- Checking web sites in advance
- Knowing how to use the software students were to use
- Being prepared to keep all students engaged throughout the class period regardless of their capabilities or learning styles
- Being flexible and having a back-up plan in case the technology does not work.

All teachers monitored students as they worked in the computer lab. Monitoring consisted of both general oversight and individual technical assistance. Teachers interacted with students in the classroom and in the computer lab. Interaction consisted of direct instruction, assisting individual students and small groups, and even just providing encouragement and acknowledging student success.

Variety of instructional activities. Teachers in this study described a variety of technologies they and their students used. In addition, their students were observed using the Internet for a variety of research activities, practicing grammar and vocabulary, doing assignments, taking quizzes and e-mailing pen-pals. Not only did teachers introduce vocabulary and grammar via their own PowerPoint presentations, but students also created PowerPoints. Students created and watched videos, listened to native speakers on

audiocassettes and CDs and used interactive drill and practice software. Integrating a variety of technology activities to facilitate language learning is consistent with the research (Bradley & Lomicka, 2000; Schultz, 2002; Stepp-Greany, 2002). Again, the available research has been conducted at the college level, not at the secondary level. Bradley and Lomicka concluded that some Internet activities lacked purpose and simply accessing information should not be the goal. The ultimate goal should be for students to communicate and apply the information. This thinking about Internet activities in foreign language classes aligns with current theory about information literacy in the larger context. Students not only need to connect with information, they must also interact with and utilize it. They need to evaluate and apply information in order to answer their questions (Todd, 2000).

Only one teacher's students were observed using e-mail. Although there appear to be several barriers to doing so (e.g., finding suitable pen-pals, school policies regarding student e-mail), research describes the benefits of using e-mail to improve communication skills and learn about other cultures (Bernhardt & Kamil, 1998; Gonglewski et al., 2001; O'Dowd, 2003).

Teachers' comments about students and technology. Teachers complimented their students on their knowledge of technology, saying they helped each other and often assisted the teacher or showed the teacher how to use new technologies. For the most part, students were well behaved in class and the computer lab; however, some came to class unprepared and did not use their time wisely.

Why teachers use technology. During their interviews, teachers responded to the second part of the grand tour question—*why*. They described their beliefs in general and those specific to foreign language instruction. Teachers explained factors they felt contributed to or inhibited their use of technology and described their own technology backgrounds and training. Four generic reasons were given for using technology:

- As a tool, not an end in itself, technology should be used only when it serves an instructional purpose.
- Teachers use technology to motivate students.
- Technology provides a variety of instructional strategies.
- Using technology improves student performance.

Teachers' beliefs about using technology reflect an understanding that technology is an important component of any teacher's instructional repertoire, regardless of subject area; however, it must be used purposefully. Technology must be combined with sound pedagogical principles and considered carefully before integrating it into instruction (Brandl, 2002; Moeller, 1997; Moore, 1999; Salaberry, 2001).

One of the reasons cited concerned me. Motivation was mentioned both in the sense of convincing students to take the class (because technology would be used in a certain class and perhaps not in others) and maintaining student engagement in learning activities. My concerns about motivation are not unique to foreign language instruction. If used in the former sense, are we forgetting about purposeful use? Is technology just a recruitment gimmick to maintain enrollment numbers? In the latter sense, yes: teachers constantly seek ways to motivate students. Using technology, especially when it is

aligned with students' multiple intelligences and learning styles, seems to be an effective motivational tool (Gonglewski, 1999; Pusack & Otto, 1997). I wonder, however, if learning is sometimes sacrificed for the sake of having fun. Although learning and having fun are not mutually exclusive, the right balance must be maintained.

All teachers said using technology facilitates a variety of instructional strategies and activities, taking into account different senses, learning styles, readiness and interest. The teachers' statements are aligned with the literature (Ayersman, 1993; Butler-Pasco, 1997; Cohen, 1997, 2001; McLellan, 1994; Mellon, 1999; Nelson, 1998; Savini, 1995). With technology, students can control the pace of their learning. Some teachers also felt technology allows students to be more creative. The teachers not only talked about the importance of variety but also were observed integrating several instructional strategies into a single class period.

Some teachers said using technology improves student performance and results in better quality student work. These teachers, for example, felt PowerPoint projects were of much better quality than the posters or brochures students had previously created. Even though teachers expressed this feeling, based on student projects and presentations I observed, I would not agree. The teachers' initial statements were not supported by observations or later comments. In another instance, the iMovie public service announcements were of limited quality and added little to the students' presentations. In spite of reasons teachers cited for using computer technology, none of the teachers could say that doing so increased student achievement. This inability to link technology with student achievement was also noted by Cuban (2001). Although his study on classroom

use of computers did not focus on foreign language classes, his findings are relevant here. In addition, as described in the next section, teachers had mixed feelings about whether or not using technology improved speaking and writing, important components of student performance in a foreign language course.

Beliefs specific to foreign language instruction. As mentioned in Chapter 2, technology was initially used in foreign language instruction for drill and practice, vocabulary and grammar activities and to improve speaking and listening skills. Over time, the emphasis has changed. Today technology assists in foreign language instruction because it:

- connects students with current, authentic resources,
- helps students develop an understanding of the target culture, and
- provides improved ways to communicate with native speakers and writers.

The reason mentioned most frequently by the teachers in this study was that technology provides nearly unlimited access to a wide variety of current, authentic resources. Research confirms this reason (Armstrong & Yetter-Vassot, 1994; Chun & Plass, 2000; Frommer, 1998; Moore, 1999; Moore et al., 1998; Pusack & Otto, 1997). Authentic resources, in turn, assist students in developing their understanding of the target culture, another reason cited by all participants and supported by research (Abrams, 2002; Gonglewski, 1999; Moore, 1999; Schultz, 2002; Walz, 1998).

Even though only one class was observed writing to e-mail pen pals and no other students were seen speaking with or writing to native speakers, the teachers stated that technology provides better ways to communicate with native speakers and writers.

Although there is no real substitute for communicating with native speakers in their country, technology is a good alternative (Gonglewski, 1999). E-mail can be beneficial in this regard (Gonglewski et al., 1998; O'Dowd, 2003). In addition, chat rooms provide opportunities for improving communication and understanding other cultures (Beauvois, 1997, 1998; Lee, 2002)

Teachers had mixed opinions about whether or not technology affects language acquisition. One teacher said, "I think it reinforces the things that we're trying to do in the classroom—acquire and use vocabulary." Another admitted, "I don't know if it really affects acquisition....Does it help them learn [the language] better? I don't know." A third teacher said, "I don't think it makes a huge difference in what they're learning or how they're learning...It's just another way to help them get excited about the language."

This dichotomy, too, is reflected in the literature. One quantitative study (Bogard, 1998) failed to support the hypothesis that writing would be of higher quality and contain more text when students used a word processor than when they used pen and paper. In his landmark study, Keating (1963) concluded that students studying French who did *not* use language labs performed better on reading, listening and speaking exams than did students who learned in labs.

Other studies have reported that technology has a positive effect on language acquisition. Students in a computer-enhanced elementary foreign language class read better; however, quantitative data showed no statistically significant difference in proficiency and only a small but statistically significant difference in achievement on tests—favoring students in the computer-enhanced class (Nutta et al., 2000). In both of

her studies, Beauvois (1997, 1998) found that students who used computer-mediated communication in college French classes had statistically significant higher scores on their end-of-semester oral exams than did students in the control group.

None of the teachers mentioned constructivism or referred to *Standards for Foreign Language Learning in the 21st Century* (1999) or even changes in foreign language pedagogy as reasons for using technology in foreign language instruction. The reasons they cited, however, align with these standards and pedagogical changes.

In addition to the teachers' beliefs, other factors were cited as contributing to and inhibiting the use of technology.

Contributing factors. When teachers were asked about factors that contributed to their use of technology, their responses clustered into the following themes:

- Student familiarity with technology
- Abundance of Internet resources
- Improved and/or user-friendly technology
- Support by district and/or building personnel such as principal and library media specialist
- Technology personnel assistance
- In-service staff development
- Access to computers in computer labs, library media center, wireless mini-lab for foreign language department
- Personal acquaintance with teacher in another country (enabling the teacher to arrange for student e-mail pen pals).

Inhibiting factors. Four inhibiting factors were cited by all teachers:

- Cost of computers, software, online subscriptions
- Limited access to technology (no computer in classroom, having just one computer in the classroom, competing for lab time with other classes)
- Lack of time to learn and practice new technology, explore, integrate technology into teaching and develop instructional activities
- Technical problems (power outages, network problems, limited network drops, incompatibility of software and hardware, students forgetting passwords, Internet not functioning or functioning slowly, changing URLs).

Cost, limited access, lack of time and technical problems are examples of extrinsic, first-order barriers (Brickner, 1995; Jacobsen, 1998; Seguin, 1995). Although some contributing factors were also extrinsic (student familiarity with technology, abundance of Internet resources, user-friendly technology, support and training), I perceived the most effective of these teachers truly believed that technology could make a difference in learning. As first-order barriers were removed, second-order barriers (the teachers' beliefs) were revealed. Research provides evidence that openness to change and effective use of technology depend mostly on teachers' beliefs about teaching and technology (Brickner; Jacobsen; Seguin). In this study, I perceived two teachers truly believed in the integration of technology, understood the impact it could have on instruction and learning and not only understood but were willing and capable of making the extra effort to ensure its effective use. I perceived three teachers had some inkling of how technology could help but did not fully understand how to integrate it. I also

perceived that although one teacher used technology a great deal during this study, she did not fully understand the role of technology in foreign language instruction, did not utilize sound instructional practices when her students used technology and, in fact, seemed to be using technology just for the sake of using it.

When asked to reflect on technology-integrated activities, teachers began with positive comments, but some continued by saying the activities did not go as well as anticipated and students had too little or too much time, came to class unprepared, did not use lab time wisely and created poor quality products or ones that contained inaccurate information. Each teacher mentioned ways she would do things differently in the future. The negative reflections, however, were not enough to deter teachers from continuing to integrate technology into student learning activities.

Background and training. Several teachers had used technology in high school and college, some simply for word processing; others for more advanced applications. Aligned with their perceptions of contributing and inhibiting factors was whether or not technology had been part of their own educational experience. Those teachers who are early adopters are more likely to have first used computers when they were high school or college students and also are more likely to integrate technology into their teaching than those teachers who adopt it later (Jacobsen, 1998).

Teachers described their first use of computers in teaching and stated their interest in technology had developed over time. They had taken high school and/or college technology classes. Most stressed that building- and/or district-provided staff development was a key factor in their use of technology. Several teachers said they had

attended technology conferences and workshops. Some of these teachers had been using technology in their teaching for several years, and two had been designated as building technology leaders.

Teachers in this study had taken the initiative to use technology personally and professionally for a number of years, and/or had participated in technology classes, workshops and in-service training. In spite of the participants' differences in ages and the fact that only the four youngest participants had used computers in high school or college, age did not seem to be a significant factor in the degree to which the teachers used technology nor in the effectiveness of their teaching with technology. In fact, the two teachers who appeared to be most comfortable with technology, used it most effectively and purposefully, tried new technologies and expressed the most enthusiasm for using technology were in the middle and upper end of the range of teachers' ages in this study. This should not be surprising. Some research on the teacher work-life cycle indicates that truly dedicated teachers, those who have decided to remain in the classroom and not seek professional fulfillment through administration or other professional positions, often concentrate on teaching quality and innovation during this period in their careers (Fessler & Christensen, 1992; Huberman, 1988).

Some teachers referred to support provided by building technology personnel and/or library media specialists. When three teachers took their classes to computer labs, they were assisted by a supervisor, technology support person and/or library media specialist. In one school, technology personnel and the teacher collaborated in planning instructional activities, teaching and monitoring students. In addition, the technology

person came to the classroom to observe the presentations students made using technology. In two schools, library media specialists were present and available to help students but interacted with them minimally. In the sixth school, technology personnel worked in the computer lab but did not assist the teacher or students. There appears to be a positive correlation between the amount and quality of technology support and the effectiveness of the technology-integrated activity in which students are engaged.

Recommendations for administrators and other teachers. Finally, teachers offered suggestions for administrators and other teachers regarding technology. These recommendations were short and reflected issues already cited as contributing or inhibiting factors:

- Provide adequate access to technology
- Provide time for teachers to learn new technologies, explore, plan and integrate technology
- Provide up-to-date software compatible with hardware, often multiple copies, available in target language
- Be aware that teachers' having back-up plans is even more critical when they use technology.

Implications for Practice

For administrators. It is imperative that administrators understand technology's potential to enhance teaching and learning in all content areas; however, administrators must become familiar with the unique ways in which technology contributes to each discipline. The potential for accessing current, authentic resources to help students

develop their understanding of the target culture is undeniable. The potential to improve language acquisition and communication skills also exists but has not been proven and may not be actively pursued by teachers. Administrators should collaborate with teachers who have demonstrated the ability to successfully integrate technology and who are willing to do so. In order to develop their own vision of what constitutes effective integration of technology into foreign language instruction, high school administrators should frequently observe classrooms where this is occurring. In addition, administrators must themselves be knowledgeable about the role of technology and be able to make sound judgments when evaluating technology-integrated instruction. My sense is that administrators often lack the time and expertise to fully understand how and why technology is being used in the classroom. They may be excited about activities they observe, such as the EuroQuest research or the iMovie public service announcements, but not understand *how* (or even *if*) they are related to the curriculum and contribute to course outcomes.

The most frequently mentioned factors that inhibit teachers from integrating technology are cost, limited access and lack of time. These are all perceived as budgetary items; however, administrators and teachers can work together to overcome these barriers. They can collaborate on writing grants, searching for economically feasible solutions and reassigning hardware, for instance. Administrators can examine teacher assignments, lab schedules and lab utilization. They can look for ways to adjust supervision schedules so a knowledgeable staff member is always available to assist students and other teachers in a computer lab.

Another factor is the importance of technology support personnel and library media specialists who not only assist teachers and students when they work in computer labs and library media centers but also collaborate with teachers, make them aware of new technologies and how they can enhance learning, and teach them how to use technology. All schools in this study had such personnel; however, the amount and type of assistance they provided varied and were perceived as making a huge difference in the effectiveness of the instructional experience.

Collaboration of library media specialists and/or technology specialists with classroom teachers is closely aligned with the effectiveness of technology-integrated instruction and student achievement. It is imperative, therefore, that administrators ensure not only the availability of these personnel but also evaluate them on criteria that include their effectiveness in working with teachers to design, implement and evaluate authentic learning experiences (American Association of School Librarians, 1998). Studies conducted in several states during the 1990s and into the 21st century, found that academic achievement is related to the size of the library media collection and the presence of a professional library media specialists who collaborate with teachers in planning and implementing meaningful learning experiences (Lance & Loertscher, 2001; Lance, Welborn, & Hamilton-Pennell, 1993).

Providing time refers to time for teachers to learn about technology, to explore, collaborate with fellow teachers, observe other teachers using technology and plan for the integration of technology into their own teaching. Administrators should encourage teachers to participate in in-service technology training. Even when teachers participate

in training, they rarely are given time to integrate technology into their teaching. If teachers are not given time to plan and apply what they have learned, then integration will not occur. In addition, administrators and teachers need to understand how technology can change teaching, not just be another tool to help teachers continue to teach in the same manner as they have been (Cuban, 2001).

The lack of time to learn about technology and plan for integrating it into instruction was cited by Cuban (2001). He found that training was not provided at times when teachers needed it and the training often did not match the teachers' needs. Technology staff development should be provided at times when teachers need it and should be based on teachers' needs (Cuban, 2001; Tubin & Chen, 2002). In order for this staff development to be effective and change the way teachers teach, it must:

- be well-planned and ongoing,
- be aligned with the school's technology environment,
- be relevant to the curriculum and classroom activities,
- include hands-on activities,
- provide time for teachers to discuss technology issues, and
- give teachers ample opportunity to apply and practice what they have learned. (Mouza, 2002-2003)

Through interactions with colleagues and participation in conferences and workshops, teachers often become excited about the potential they see for technology to enhance instruction and learning in their classrooms. Unfortunately, when some teachers ask for this technology, their requests are often denied because of cost, hardware/software

incompatibility, technology standards and the inability to provide adequate technical support. As administrators and curriculum personnel, we sometimes "dangle the carrot" in front of teachers only to have them deterred by barriers when they attempt to implement technology they have seen. For teachers, the process for implementing technology seems long and bureaucratic. Administrators, curriculum personnel and teachers must work together in discussing the purpose for using technology; the appropriateness of new technologies in instruction and learning; how they align with existing technology, technology standards and technical support; and possible alternatives should it not be possible or prudent to obtain the requested technologies.

In addition, assuming technology integration has the potential for improving foreign language learning, it is important for administrators to recruit and hire foreign language teachers who are graduates of teacher preparation institutions that stress the integration of technology into foreign language teaching and require pre-service teachers to prepare electronic portfolios demonstrating their skill in teaching with technology.

For curriculum personnel. This study has implications for curriculum personnel—a position I currently hold in my own district. This study has increased my knowledge of why technology is important, how it can enhance learning, and factors that affect whether or not technology is used and, if so, if it is used effectively. I need to share this knowledge with administrators and teachers to make them more aware of how technology can be used. When curriculum is revised and/or when new resources are adopted, it is important that technology be considered. In addition, teachers must not only be given opportunities to learn how to use these technologies but also be given time

to integrate them effectively into instruction. Administrators, curriculum personnel and teachers must collaborate in this effort.

For teachers. Most importantly, curriculum must drive technology use, not vice versa. Based on instructional objectives, teachers need to determine the purpose for using technology and then plan for its integration. Careful planning is critical to successful technology integration. Teachers should be cognizant of the following recommendations as they plan and implement teaching with technology:

- Check the accuracy of URLs each time they are given to students.
- Make sure URLs aren't filtered out and, if they are appropriate for instruction but blocked, ask that they be unblocked.
- Make sure required software is loaded on computers.
- Know how to use the software and hardware students will use.
- Know students' technology skills. This will determine how much needs to be taught and how much direction needs to be provided for Internet searches.
- Determine how to engage students who finish early.
- Determine how to accommodate slow students.
- Prepare clear, thorough student directions.
- Let students know exactly how their work will be evaluated.
- Set high expectations and evaluate student work just as rigorously when students use technology as when they do not.
- Determine benchmarks, check points or daily goals when working on larger projects.

- Monitor students closely.
- Provide frequent feedback and encouragement.
- Keep your hands off the keyboard. Don't be tempted to demonstrate something by typing yourself. Explain verbally; let the students type.
- Plan activities so students focus on content, not just on technology.
- Collaborate with technology and/or library media personnel in planning technology-integrated activities.
- Be flexible. Have a back-up plan.
- Try something, then evaluate and modify. After all, teachers should use this approach in all their teaching.

Implications for Research

This study was limited by its design and served only as an exploratory study. Although I would have enjoyed designing and conducting a quantitative study, I did not feel this topic could be described by statistics. I wanted to explore. I wanted to describe a phenomenon. Therefore, I used qualitative methodology. I now feel the story of technology's use in foreign language instruction warrants several additional studies using both qualitative and quantitative techniques to examine the phenomenon from a variety of perspectives. Further research would contribute valuable insight into how technology is used in foreign language instruction.

- To develop a deeper understanding of how a master teacher integrates technology into foreign language instruction, a semester- or year-long

immersion as a participant-observer in a single teacher's classes might be warranted.

- To develop a better understanding of how and to what degree technology is used in foreign language instruction throughout the state, a well-designed, statewide survey should be developed.
- It may be appropriate to design a study to evaluate the effectiveness of using technology to enhance language acquisition. This would be a huge task. Without this type of research, however, any other research seems to be meaningless.
- Because most of the research mentioned in the literature review was conducted at the college level, it seems advisable to replicate some of these studies at the high school level. It might also be appropriate to consider whether or not there is any correlation between student age (or level of language being studied) and the effectiveness of technology-enhanced language learning.
- It may be appropriate to determine if there is any correlation between the amount and type of technology support and/or collaboration and the effectiveness of using technology in instruction.
- It also may be useful to design a paired study comparing teachers' and their administrators' perceptions of how technology could and should be used and how it actually is being using in foreign language instruction in their schools.

The first of these recommended studies would be qualitative and hopefully develop a deeper understanding of this phenomenon than this study was able to do. So many times I had to remind myself not to make judgments based on a handful of observations. Being an observer for an extended length of time would enable the researcher to paint a richer picture of the phenomenon.

Personal Reflections

Often in a qualitative study, feelings emerge that are unanticipated, surprising, and sometimes so subtle the researcher recognizes them only as he or she begins to reflect on the results. Such was the case in this study. The difficulty in identifying participants for this study may have been more than just a logistical problem. I had hoped to create a pool of potential participants and then narrow the field to just those who seemed best suited for the study. This did not happen. I was fortunate that six teachers were recommended and agreed to participate. The other feeling was that teaching with technology is not a substitute for sound teaching practice and classroom management. In fact, teaching with technology seems to demand even better teaching skills. While both feelings developed during the study, I did not realize their significance until I began to reflect on the results.

Difficulty in identifying participants. While I have long known that using technology is not a substitute for good teaching, the difficulty in identifying participants was a surprise. I had contacted foreign language teachers, library media specialists, technology specialists, district and building foreign language department heads and administrators from several districts and foreign language consultants from state agencies

and institutions in hopes they could recommend potential participants for this study. Few teachers were recommended; some recommendations were for teachers whose names had already been given me. Some teachers declined to participate. Only six were recommended and agreed. I contacted personnel in several school districts, including the largest ones in the state. These districts represented nearly half the state's public school enrollment. One district administrator said very few high school teachers in his district use technology; therefore, he could not recommend anyone. One contact in a large high school, well-known for its integration of technology, said he could not recommend anyone because foreign language teachers in his building seldom used technology. In other instances, library media specialists were unable to identify potential participants. The difficulty in identifying participants may be an indication of the extent of technology integration in foreign language instruction in this state.

Although disappointed in being able to identify so few foreign language teachers who use technology, I felt vindicated after reading Larry Cuban's (2001) study. His research of classroom computer use in Silicon Valley elementary schools and high schools and at Stanford University found infrequent and uneven use of computers in these schools. "Less than 5 percent of teachers integrated computer technology into their curricular and instructional routines" (p. 133). The difficulty I had in identifying participants was not unique.

Using technology is not a substitute for good teaching. As I interviewed and observed teachers, I wondered how much administrators knew about these teachers' use of technology. Had the administrators actually observed their teachers using technology?

On what were the administrators' recommendations based? Were these recommendations, perhaps, simply a result of the halo effect? I suspect that because some participants were perceived favorably on some aspects of their work, or on personal characteristics or because they had given technology presentations, they were also perceived to be using technology effectively. Yes, all participants used technology in instruction; however, some teachers used technology infrequently and, in a few instances, appeared to do so ineffectively. These teachers were recommended because they were perceived to be using technology effectively in instruction. In some instances, however, it appears these perceptions did not match reality. Teaching effectively with technology underscores the need for good teaching skills, perhaps even better teaching skills than teaching without technology. In some instances teachers used technology without demonstrating sound teaching skills.

Several teachers modeled effective teaching practices both when they used technology and when they did not. Technology was truly just a tool for them, not the driving force. They planned activities in advance, were flexible, had back-up plans, collaborated with technology and library media personnel, monitored students closely and interacted with them throughout each class period, set goals for each day's activity and held students accountable for all components of their work. On the other hand, some teachers seemed to use technology without much purpose. They did not plan in advance, set daily goals or monitor students closely, and they provided only cursory evaluations of student work. In some instances, the amount of time students spent in a computer lab did not seem commensurate with instructional objectives or quality of student work. Some

teachers could explain in only the briefest of terms why they had their students use technology.

Evaluation of instruction and learning was not the purpose of this exploratory study. Just the same, it is difficult not to form opinions about what was observed. Just as teachers expressed disappointment in some aspects of their students' work, I expected better quality student products and more proficiency by students in their oral presentations. Although teachers stated that technology should be used purposefully, this did not always appear to be the case.

Final thoughts. This study confirmed that, indeed, these teachers used technology in instruction and, more importantly, their students used technology for a variety of purposes, mostly to develop an understanding of the target culture. Teachers used technology to motivate students, provide a variety of instructional strategies and connect students to current, authentic resources.

The primary purpose of technology-integrated foreign language instruction was to help students develop an understanding of the target culture by making connections to information, cultures and other disciplines; comparing and contrasting cultures and languages; and participating in multilingual communities. Using computers to develop and enhance communication skills occurred infrequently and seemed to serve only a secondary purpose. No evidence was found, either in what teachers said or what I observed, that the use of technology improved students' reading, writing, listening and speaking skills.

The answers to the *how* and *why* questions were not surprising. There were no amazing revelations. What was surprising was the small number of teachers who were recommended for the study. In addition, the fact that some used technology ineffectively was disappointing. Although teachers used technology, it had not changed instruction. Technology was simply another tool teachers used to continue to teach in pretty much same way they had always taught.

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Appendix A

Institutional Review Board Letter of Approval

University of Nebraska Medical Center

NEBRASKA'S HEALTH SCIENCE CENTER
A Partner with Nebraska Health System

Institutional Review Board (IRB)
Office of Regulatory Affairs (ORA)

February 26, 2002

Clara Hoover
13345 Madison Street
Omaha, NE 68137

IRB#: 047-02-EX

TITLE OF PROTOCOL: Foreign Language Teachers' Use of Technology in Instruction: A Phenomenology

Dear Ms. Hoover:

The IRB has reviewed your Exemption Form for the above-titled research project. According to the information provided, this project is exempt under 45 CFR 46:101b, category 1 & 2. You are therefore authorized to begin the research.

It is understood this project will be conducted in full accordance with all applicable sections of the IRB Guidelines. It is also understood that the IRB will be immediately notified of any proposed changes that may affect the exempt status of your research project.

Please be advised that the IRB has a maximum protocol approval period of three years from the original date of approval and release. If this study continues beyond the three year approval period, the project must be resubmitted in order to maintain an active approval status.

Sincerely,

Ernest D. Prentice PhD/HOK

Ernest D. Prentice, Ph.D.
Co-Chair, IRB

Service Building 3000 / 987830 Nebraska Medical Center / Omaha, NE 68198-7830 / 402-559-6463 / FAX: 402-559-3300
Email: irbora@unmc.edu / http://www.unmc.edu/irb

Appendix B

Participant Release Agreement

Participant Release Agreement

I agree to participate in a research study of how high school foreign language teachers use technology in classroom instruction. I understand the purpose and nature of this study and am participating voluntarily. I grant permission for the data to be used in the process of completing the research project, including any future publications. I understand that my name and other demographic information that might identify me will not be used. I further understand that my participation in this investigation will not harm my social or professional status.

Interview Release

I agree to meet at _____ on _____ for an interview. I also grant permission to tape record the interview. I understand that the tape recording will be transcribed within two weeks.

_____ _____

(Research Participant) (Primary Researcher)

_____

(Date)

Appendix C

Preliminary Information Form

Preliminary Information Form

Teacher's Name:

Age:

Gender:

Position:

School:

School Address:

School Phone:

Home Phone:

E-mail:

What languages do you teach?

What levels of the languages do you teach?

How many years have you taught these languages?

How many years have you taught in your current building?

Please provide your class schedule, including times of classes.

Please list the types of technology you have used, or plan to use, with your classes during the spring 2002 semester. (If you teach multiple languages, or different levels of the same language, please provide separate lists for the different classes.)

Please describe some technology-integrated activities you have used, or plan to use, in your classes during the spring 2002 semester. (If you teach multiple languages, or different levels of the same language, please provide descriptions for the different classes.)

Appendix D

Initial Interview Protocol

Initial Interview Protocol

Interviewer:

Interviewee:

Date of Interview:

Time of Interview:

Place of Interview:

Questions:

1. Tell me about your experience as a teacher. (Years of service, types of positions)
2. Describe your experience using technology in instruction.
3. What types of technology do you use in instruction? (How frequently?)
4. What instructional methods do you use with technology?
5. Why do you use these technologies and instructional methods?
6. Specifically, how does technology affect foreign language acquisition?
7. Has technology changed your teaching? If so, describe how it has changed your teaching? (Teaching philosophy, style, attitudes, planning, classroom management)
8. Has technology affected student thinking, learning and/or achievement? If so, how?

9. Do your students use technology as part of their learning experiences?

   If yes, how? If no, can you assess why not?

   If yes, what types of thinking and skills are involved when your students use technology?

10. What factors contribute to, or inhibit, your use of technology in instruction?

11. How did you get started using technology?

12. Have you been trained in the use of instructional technology?

    If yes, what kind of, and how much, training?

13. Is there something else you would like to tell teachers or administrators about the use of technology in foreign language instruction?

(Thank teacher for participating in this interview. Assure him or her of confidentiality of responses and potential future interviews.)

Appendix E

Wrap-Up Interview Protocol

Wrap-Up Interview Protocol

1. Briefly describe what I saw in observations.

2. Was this typical of other times when you've used technology?

3. How frequently do you use technology in instruction?
   (For each of the types of technology I saw used?)

4. How did you feel about what I observed?

5. Is there anything you would do differently?

6. How did you accomplish these instructional outcomes or objectives (what I observed) before you integrated technology into the process?

Specific Questions:

Anything else you'd like to say?